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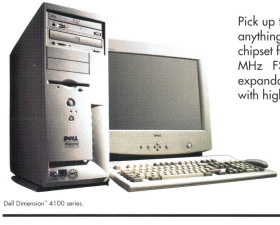
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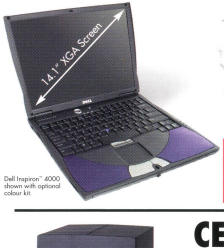
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Dell Inspiron™ 4000 shown with optional colour kit

**Inspiron™ 4000**

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Sydney Morning Herald, IT October 31, 2000

The Dell Inspiron™ 4000 gives you a choice of processor speed (up to 850MHz) outstanding performance and ATI mobility 128 Video for blazing fast 2D and 3D graphics. This is backed by up to 20GB¹ of storage space, SDRAM expandable to 512MB and media bay flexibility. Pick an optical device, a second battery, or an internal floppy disk drive. Plus, choose your colour with an optional colour kit. – all in a slimline 2.36kg package.

**FREE** UPGRADE TO 128MB SDRAM
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- SoundBlaster Live! Value .576Voice Sound Card
- Altec Lansing ACS-340 Speakers with Subwoofer
- 19" Color Monitor (18.0"v.i.s.)
- Logitech 4-button MouseMan® Wheel (PS/2V)
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- 3-Years Limited Warranty ■ 56K V.90 Telephony Modem
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**Ultra-Light**

- Mobile Intel® Pentium® III Processor 500MHz
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  - ▶ UPGRADE TO 128MB SDRAM. Valid till 2/3/01
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- Microsoft® Windows® Millennium Edition
- Microsoft OEM Works Suite 2000
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## DELL™ INSPIRON™ 4000 G800GT NOTEBOOK

**Road Warrior**

- Mobile Intel® Pentium® III Processor 800MHz featuring Intel® Speedstep™ technology
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  - ▶ FREE UPGRADE TO 128MB SDRAM. Valid till 2/3/01
- 8X DVD-ROM / 14.1" XGA TFT Screen (1024x768)
- Microsoft® Windows® Millennium Edition
- Microsoft OEM Works Suite 2000
- Internal V.90/56K Modem Mini-PCI / Carry Case
- 1-Year Limited Warranty (Next Business Day On-Site² Response With International Coverage³)

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## DELL™ INSPIRON™ 4000 G850GT NOTEBOOK

**Road Warrior**

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- 8X DVD-ROM / 14.1" XGA TFT Screen (1024x768)
- Microsoft® Windows® Millennium Edition
- Microsoft® OEM Works Suite 2000
- Internal V.90/56K Modem Mini-PCI / Carry Case
- 1-Year Limited Warranty (Next Business Day On-Site² Response With International Coverage³)

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## DELL™ INSPIRON™ 8000 C800VT NOTEBOOK

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- 8X DVD-ROM ▶ ADD: 8X CD-RW $719⁴ / 15" Hi-Res SXGA TFT Screen (1400x1050)
- Microsoft® Windows® Millennium Edition
- Microsoft® OEM Works Suite 2000
- Internal V.90/56K Modem Mini-PCI / Carry Case
- 3-Year Limited Warranty Next Business Day On-Site² Response With International Coverage³)

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## DELL™ INSPIRON™ 8000 G850U NOTEBOOK

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- Integrated 3Com 10/100 Ethernet Controller
- Integrated Dual ATA-100 EIDE Controller
- Integrated 16-Bit Sound ■ 17" Colour Monitor (15.9" v.i.s.)
- 32MB nVidia Quadro G450 Graphics Card (Dual Monitor Capable)
- 48X Max Variable EIDE CD-ROM Drive
- Microsoft® Windows 2000
- 3-Year Limited Warranty (with 3-Year Next Business Day On-Site² Service)

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- Intel® Pentium® III Processor 866MHz (Dual Processor Capable)
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  - ▶ UPGRADE TO : 256MB SDRAM With ECC $101⁴
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- 128MB SDRAM With ECC (Upgradeable to 2GB)
- 9GB¹ 10k Ultra160 SCSI Hard Drive
- Integrated Pro 10/100 NIC
- Integrated Ultra2/DVD and Ultra/Narrow SCSI Controllers
- Integrated Single Channel RAID Controller (Optional)
- 12/24X EIDE CD-ROM Drive
  - ▶ ADD : APC 700VA UPS Backup Power Supply $769⁴
- 3-Year Limited Warranty (With 1-Year Next Business Day On-Site² Service)

$4,369 $36.35 PER WEEK

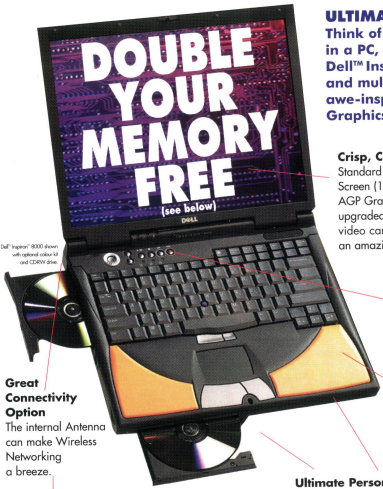
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Dell™ Inspiron™ 8000 shown with optional colour kit and CDRW drive.

## ULTIMATE PERFORMANCE

**Think of all the things you could ever want in a PC, and put them in a notebook. The new Dell™ Inspiron™ 8000 offers a level of power and multimedia performance that is truly awe-inspiring. It comes standard with 4X AGP Graphics, and a Hi-Res active/TFT screen.**

**Crisp, Clean Graphics**
Standard with 14" Hi-Res Screen (1400x1050) & 4X AGP Graphics. Screen upgradeable to 15" and video card upgradeable to an amazing 32MB.

**"The [Inspiron 8000's PC World Bench 2000] score of 161 is the highest ever attained by a notebook"**
**Australian PC World, December 2000.**

**Easy Internet Access**
Use the access direct buttons for one touch access to Dell Technical support for the Internet or email.

**Great Connectivity Option**
The internal Antenna can make Wireless Networking a breeze.

**Great Looks**
Optional Colour 'snap-on' kit for palm rests. Choose from Storm Grey, Tahoe Blue, Purple, or Yellow.

**Amazing Video Editing Capabilities**
Integrated Firewire port for hot-pluggable high speed data transfer. Lets you easily download and edit digital videos and photos.

**Ultimate Personalisation**
Imagine the possibilities... 2 optical bays give you the freedom to configure your Inspiron 8000 exactly how you want it. How about DVD + CDRW at the same time. Record CD's, watch DVD movies, or even transfer data from CD to CDRW on the go[2]. The possibilities are endless.

## DELL™ INSPIRON™ 8000 G700XT NOTEBOOK

- Mobile Intel® Pentium® III Processor 700MHz
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- 14" Hi-Res SXGA Screen (1400x1050)
- 24X CD-ROM
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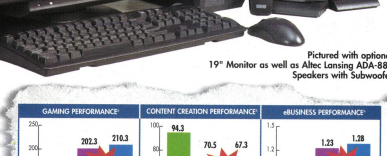
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Pictured with optional 19" Monitor as well as Altec Lansing ADA-885 Speakers with Subwoofer

The Dell™ Dimension® 8100 is the next generation in PCs. Powered by the new Intel® Pentium® 4 processor (for speeds of 1.3 to 1.5GHz), the system delivers record breaking performance on multimedia intensive tasks, content creation and games. Just take a look at the benchmark tests. What's more, this amazing performance won't be threatened by bottlenecks, thanks to the newly engineered Hyper Pipelined Technology and 400MHz System Bus with dual channel RDRAM. And with a price of just $2,499†, you certainly are getting the latest technology at a great price.




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- 32MB NVIDIA TNT2 M64 4X AGP Graphics Card
- SoundBlaster Live! Value 5.76Voice Sound Card
- 48X CD-ROM
- Harmon Kardon Stereo Speakers / 56K Modem
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- 17" Colour Monitor (15.9"v.i.s.)
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- 3-Years Limited Warranty

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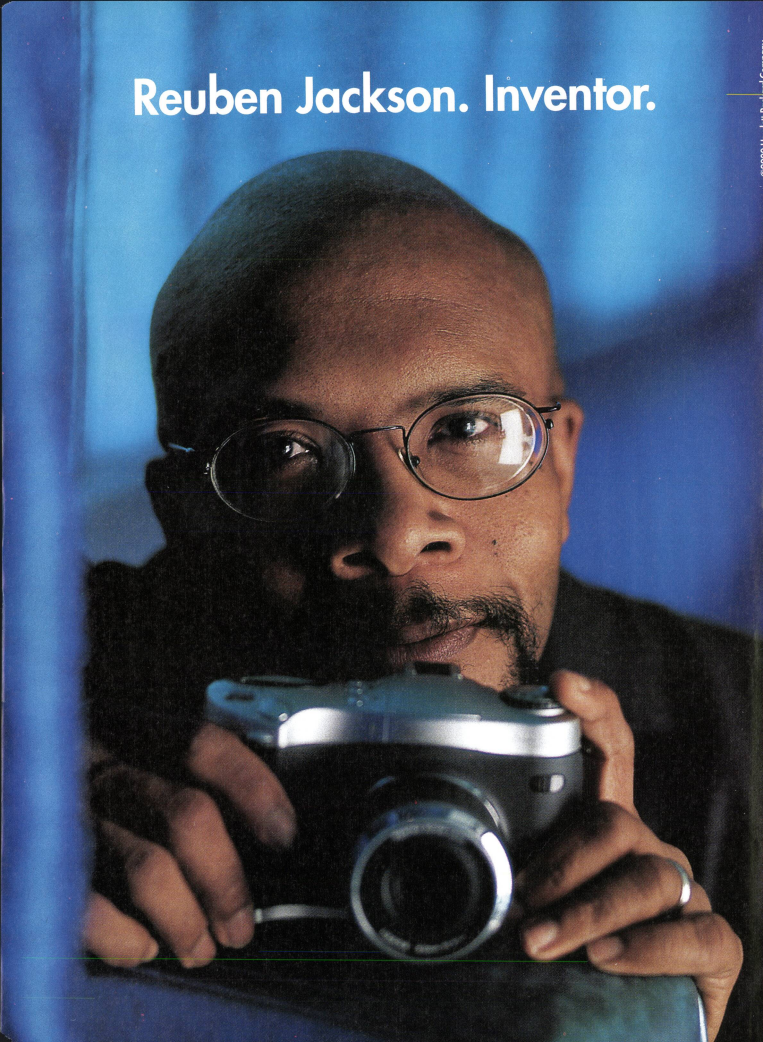
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# Reuben Jackson. Inventor.





Inspiration is all around us.
Reuben finds his in jazz,
Buddha, new fallen snow and poetry.
Capturing these feelings, sharing them,
requires new kinds of tools.
Digital photography for example.
Think of it as photography, part 2.
No film, no developing, keep only the pictures you
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without a computer, or even cables.
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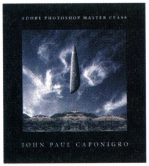
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**CorelDraw 10 - The Official Guide** - *Steve Bain*

Whether you are an illustrator, designer, engineer or architect, this easy guide will suit. Expert guidance on how to master a variety of illustration techniques plus all the support information that you'll need to operate this powerful illustration program.

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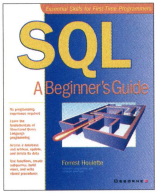



**Adobe Photoshop Master Class** - *John Paul Caponigro*

You'll gain remarkable insights into internationally recognised fine-art photographer John Paul Caponigro's creative process and learn how Photoshop can help you develop your own aesthetic and craft.

Each chapter in this elegantly designed, full-colour book is organised around a specific visual theme: atmospheric perspective, selective focus, split-toned or subdued-colour images, for example. Every chapter starts with an introduction to the visual concept then moves on to a step-by-step illustration of the process. This book is a visual treat and an inspiration.

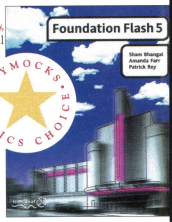
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**SQL - A Beginner's Guide** - *Forrest Houlette*

Approaches teaching SQL the way most people learn it by focusing on critical tasks first. Structured pedagogy enhances the learning experience: modules, goals, projects, mastery checks, 1 minute drills. All coding is based on real world scenarios. Projects include prebuilt databases including: product tracking database, order entry for small business, patient tracking for medical facilities and more.

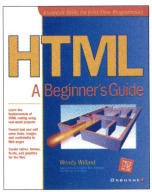
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**Foundation Flash 5** - *Sham Bhangal, Amanda Farr, Patrick Rey*

The ultimate Flash guide! Individual chapters are tutorial based, stand alone exercises that take the reader step-by-step to a complete comprehension of this powerful design tool. The introduction to Flash is based on the latest version and its expanded capabilities and tutorials will be invaluable to the dedicated designer.

$69.95




**HTML - A Beginner's Guide** *Wendy Willard*

Design expert, Wendy Willard shows you how to plan the structure and navigation of your site, format Web pages, work with text, links, colour and add graphics and multimedia to your site. You'll also learn to use related technologies including JavaScript and cascading Style Sheets (CSS).

$49.95

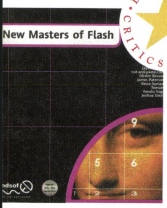



**Flash 5 Virtual Classroom** - *Sahlin*

Flash is a vector based Web design program from Macromedia that delivers beautiful animations, music tracks, sound effects and state of the art interface design without requiring a lot of bandwidth. More than 90% of current web browsers are delivered with Flash plug-ins pre-installed. This book is designed to appeal to the new user.

$69.95

DYMOCKS CRITICS CHOICE




**New Masters of Flash** - *Sahlin*

The award winning designers who wrote this book will inspire web artists using cutting edge Flash design techniques, as well as giving hard tutorial information on how to build top notch effects. The book includes a CD with animated tutorials of effects presented in this book.

$134.95

**Adobe Illustrator 9.0 'Classroom in a Book'**

Following the lab-tested *Classroom in a Book* approach, each chapter builds on your growing knowledge of the program. Start with basic lessons on Illustrator 9's interface, tools, and brushes, and then move on to how to manipulate type, blend colours, apply special effects, and prepare finished work for print or the Web. The companion CD-ROM includes project files for each lesson, letting you immediately put your new skills to work.

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**Adobe GoLive 5.0 'Classroom in a Book'**

In this thorough, self-paced workbook, you'll find lessons on everything from the basics such as toolbars, palettes, and layout design, to powerful professional-level topics like site management tools, cascading style sheets, and image maps. The book's CD-ROM includes customised files and images for each lesson, giving you hands-on experience with GoLive 5.0 as you learn, even if you've never opened the program before. Find out for yourself what makes *Classroom in a Book* the bestselling series of software training workbooks.

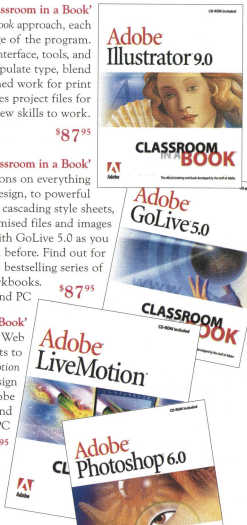
Platform: MAC and PC

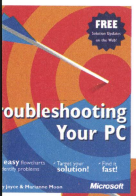
$87.95

**Adobe LiveMotion 'Classroom in a Book'**

Because everyone's new to LiveMotion, Adobe's Web graphics and animation package, there are few experts to turn to for advice. That's why *Adobe LiveMotion Classroom in a Book* is a must-have for seasoned Web design pros and novices alike: It was developed by the Adobe Creative Team and tested in the company's own labs and classrooms. Platform: MAC and PC

$87.95

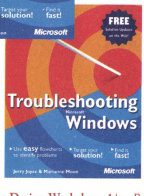



**Troubleshooting Your PC**

Solve your own hardware and software problems. Each section opens with troubleshooting chart to help quickly diagnose the source of the problem. It offers clear step-by-step solutions to try right away, plus a full chapter of things to do to stay out of trouble. Continuous support via the Troubleshooting "Latest Solutions" website.

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**Troubleshooting Microsoft Windows**

Pinpoint and solve your own software problems. Fast! Troubleshooting charts help diagnose the problem. A full chapter of step-by-step solutions plus things to do to stay out of trouble or learn a new trick. Continuous support via the Troubleshooting "Latest Solutions" Web-site. This book covers Troubleshooting for Windows 95, Windows 98, Windows 98 Second Edition, and Windows Me.

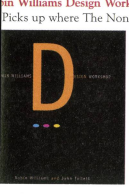
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Master Photoshop skills at your own pace! Adobe's own training experts provide readers with a comprehensive tutorial to Adobe's powerful image editing software.

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**in Williams Design Workshop, 1/e** - *Robin Williams & John Tollett*

Picks up where The Non-Designer's Design Book leaves off. So if you've already got the basic know-how, here's how to get to the next step of creative design. Seasoned pros and beginning designers alike will appreciate the examples of visual metaphors, visual impact, problem-solving, and practical lessons on how to work with color, photos, and clip art.



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DYMOCKS BOOKSELLERS

# CONTENTS

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You can also use the feedback form on our Web site:

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### Reader enquiries/back issues

**Contact** Editorial Assistant

**Phone** (02) 9288 9123

**Email** apc@acptech.net

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Please let us know if you have an idea for an article or review you'd like *APC* to cover.

If you'd like to write for *APC*, please email **apc@acptech.net** a brief résumé with an outline of your experience and interests, a sample of your writing and an outline of the article you have in mind. We appreciate submissions, but can't guarantee a reply.

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**Editorial email** apc@acptech.net

**Press releases** newswire@acptech.net

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## Advertisers' index

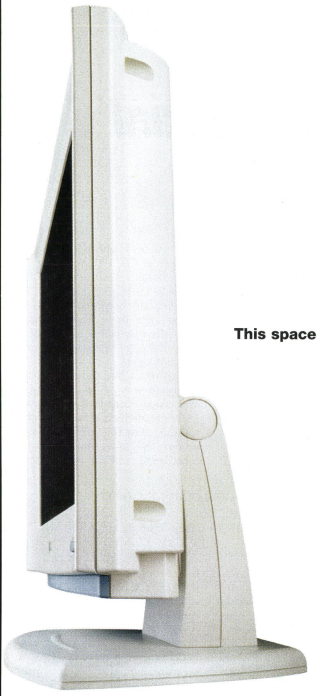

| | |
|---|---|
| Accsoft | 109 |
| AES | 119 |
| American Power | 65 |
| Caldera | 105 |
| Canon | 19, 21, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57 |
| City Software | 79 |
| Compaq | Gatefold, inside back cover |
| Dell | Gatefold, inside front cover, 1 |
| DiGiCOR | 61, 63 |
| DirectOne | 31 |
| Dymocks | 4, 5 |
| Focal Point Computing | 111 |
| Galas Electronics | 87 |
| Gateway | 32, 33 |
| Hallmark | 117 |
| Hewlett Packard | 2, 3, 73 |
| Hitachi | 23 |
| In Learning | 133 |
| iPrimus | 27 |
| LG Electronics | 7 |
| Lan 1 | 29 |
| MacSense | 69, 71 |
| MicroGram | 135 |
| Minolta | 17 |
| MSI | 129 |
| NEC | 11 |
| Ocean Office Automation | 122, 123 |
| Servex | 77 |
| Sony | 15 |
| Toshiba | 102, 103 |
| TPG Internet | Outside back cover |
| Viewsonic | 93 |

**PC SUPERMARKET**

| | |
|---|---|
| Australia Computers Online | 157 |
| Australian Computer Recyclers | 162 |
| Australian PC Accessories | 148 |
| Corporate Software | 158, 159 |
| EcomComputers | 145 |
| EISA | 149 |
| Everything Linux | 146 |
| Focus | 160 |
| Forté | 152, 153 |
| Lab Systems | 156 |
| Microtech | 154 |
| National Communications | 155 |
| New Reality | 150, 151 |
| PC Club | 161 |
| Swann | 147 |

**MARKETPLACE** 163 to 168

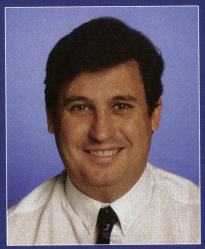
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**Glenn Rees**

Glenn Rees is publishing director of ACP Tech and can be contacted at apc@acptech.net.

*A new editor and improvements to our Web sites make for an exciting 2001.*

# Looking forward

Choosing a new editor for *APC* isn't an easy task. At stake is not only more than 20 years of tradition as Australia's top-selling technology magazine, but also the magazine's lofty status within the IT industry and among its loyal readers.

As you would expect with such a prestigious job, there were a number of high-quality applicants vying for the position. However, in the end we couldn't go past David Flynn.

David is one of Australia's most respected and experienced IT journalists. He has written for various IT titles, including *APC* and its associated publication *PC User*, for many years. He joined the *Sydney Morning Herald* in 1997 to help launch its Internet and computer supplement, Icon. Instrumental in reshaping and turning Icon into one of the newspaper's most successful sections, David has spent the last two years as its editor .

Perhaps most importantly, David has a passion for technology and a great vision for *APC*. Not wishing to steal David's thunder, I'll leave it for him to reveal this vision for the magazine to you in the coming months' issues.

David will take up his duties as *APC* editor on March 19. In the meantime, deputy editor Vanessa Richardson and her dedicated team are ensuring that the magazine maintains its usual high standard.

The team is also making some changes to the *APC* Web sites. As most readers would be aware, Newswire no longer publishes breaking news. Still operating as a site in its own right (**newswire.com.au**), Newswire now serves mainly as a news section for **apcmag.com** and *APC* magazine.

You won't find masses of news stories covering every significant and insignificant IT development. There are plenty of other news sites fulfilling that role. Newswire covers only the stories that we feel are most important for our readers, and they are covered in greater depth. We also provide useful regular columns such as Beta Beat and Gamespy.

Choosing a new editor for *APC* was not an easy task.

Complementing the regularly updated reviews, features and tutorials, massive archive of *APC* articles and our ever-popular Start page, Newswire ensures that **apcmag.com** remains Australia's best and most popular IT site. We're also in the process of tweaking the site design to provide faster performance and a fresher look, and we are beta testing revamped discussion forums.

That's not to say we will be resting on our laurels after these changes. We are planning a number of significant improvements to **apcmag.com** in the coming year, so stay tuned for announcements regarding these.

12 **CD Contents**
24 **First Take Contents**
101 **Corporate IT Contents**
113 **Workshop Contents**
6 **Advertisers' Index**
6 **Contacts**

40 **Readers' Say**
42 **Flashback**
44 **Two Bits**
50 **Price Watch**
Tips on buying RAM
52 **Cutting Edge**
The technology behind tetanising beam weapons


## AFTER HOURS


169 **GameZone**
Mechwarrior 4: Vengeance; Pro Rally 2001; Metal Gear Solid; Zeus: Master of Olympus; Tony Hawk Skateboarder 2; EA Sports FIFA 2001; Insane; American McGee's Alice

173 Gamespy

174 **Best Ever Games**
Fighting games

176 **Review Special**
Collection organisation software

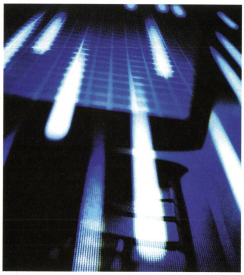
179 **From the Stack**
Read about big corporations, big networks and big problems

181 **Random Notes**
Try *APC*'s tasty mix of metal and electronica

182 **Web File**
Get up to speed on all sorts of science and technology issues with these sites

184 **Chip Chat**
The serendipitous delights to come from the Telstra New Wave labs


## FUTURE SOUND
## Is there life after Napster?



**Napster has made its mark** on the Net and shaken up the music industry. *APC* reflects on the short history of online music and examines the technologies and prospects for the future.

58



## TECH-SMART KIDS
## Fact or fiction?

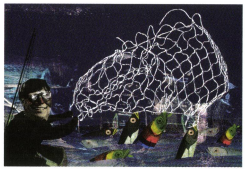
**Computers were first introduced** into Australian schools more than 20 years ago. Are IT-savvy teachers and technology-equipped classrooms still a distant promise for most students?

66

## MICROSOFT.NET Visual Studio and beyond

**For close to a year, Microsoft has been espousing its .NET vision;** it's a set of services, an environment, a platform . . . Now parts of the vision are becoming reality, it's time to examine the direction the .NET initiative is taking.

*APC* spoke to Microsoft's Brad Abrams about the future of .NET and Microsoft's decision to turn away from Java.

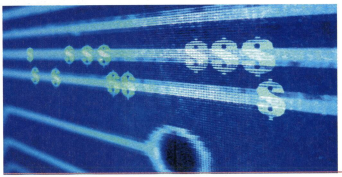


In Corporate IT 107



**In addition, *APC* put the Visual Studio.NET** development suite to the test. It has some great enticements for programmers, but what's the catch?

In First Take 24



## NET FRAUD
## Stopping the scams

**Fraud is a huge problem** for Net retailers. New technologies designed to combat fraud are a major step in the battle to make ecommerce secure. *APC* looks at the systems that will help online shopping take off.

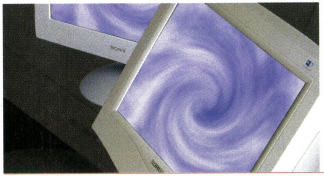
54

## IN PRINT
## 11 laser printers reviewed

**The best news about laser printers** is that prices have dropped. They are also faster, quieter and have greater printing capacity than ever before. *APC* examines models for all purposes, so you can select the best option for your needs.



74



## SCREEN TEST
## 17in CRT and LCD monitors

***APC* reviews a range of 17in CRT and flat-panel LCD monitors** to rate the budget and deluxe alternatives. Find out what kind of monitor you can afford and what kind of performance you can expect.

90

## SHRINK AND SORT
## Compression & collection tools

**For fast downloading** you need small files. *APC* tests 10 major compression utilities to find the best and fastest.






84

**Whether its MP3s, DVDs or garden gnomes,** your collection needs organising. Keep track of what you have already and what you desperately need — and make sure all your stuff is properly insured. Read about the tools designed to bring order to the most chaotic collection.

In After Hours 176

LCD1530V



LCD1525M – white



LCD2010X



LCD1525M – black





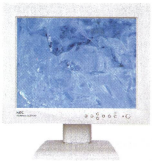
LCD1810X – black



LCD1810X – white



LCD1525X



LCD1510+

## Multiple Choice

No one offers you a range of LCD Monitors quite like NEC. For users who need superior image quality in a small space, the NEC MultiSync LCD monitors deliver bright, sharp screen performance in a slim, lightweight package. Select from 15", 18" and 20" models with a choice of options including multimedia, USB, adjustable height, analog and digital (DVI) connectivity and the versatility of portrait/landscape capabilities. All monitors have detachable bases to enable either wall or arm mounting. With 60% less depth and 70% less weight than a CRT monitor desk space is substantially reduced. With so many models and options to choose from, NEC provides revolutionary flexibility to meet the needs of every user.

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# 2CDs

## What's hot on APC March CDs

For a complete list of programs featured on the March CDs, see the CD sleeve.

## Ultima Online: Renaissance



**Free full working version as sold for $49.95, plus 15 days' free online playing time!**

Explore the captivating virtual world of Britannia in this online role-playing game. Cross swords and build alliances with thousands of players around the world. Because you interact with real people, Ultima Online: Renaissance is incredibly absorbing. Be and do whatever you want: run a bar, farm the land or lead exploration parties. You can build cities, make friendships and wage wars in this sophisticated online world.



## Score Big: AFL Footy Tipping Software

Kick-start the footy season with this enjoyable and easy-to-use office pools software, officially licensed by the AFL. Use it to run your organisation's tipping competitions.

## Shrink and sort

### Compression utilities

If you lack hard drive space or want to send large files to your friends without frying your modem, you need a compression utility. This month, *APC* has collected a wide variety of utilities to cover just about any compression-related task. Be sure to check out our comprehensive review on page 84.




### Collection utilities

Sort your clutter! CD 2 contains a range of software for organising almost any type of collection. Includes: AudioVideo Keeper, Book Librarian, El Vaquero Alegre MediaMan 5.1, Garage Sale '98 1.0, Household Register 5.10, Latshaw All Media Library 7.1, Mediathek Millenium Edition, Movie Organizer 1.4, Music Database 3.5, Video Collection Manager 1.4.

**Plus** all our regulars, including our Patch Panel section, MP3 tracks and a selection of shareware reviewed by our OS specialists.

## Your guide to the cover CDs

The *APC* cover CDs complement the magazine and **apcmag.com**. Each month's disc collection features software related to articles in that issue, as well as special CD-only features and Web browsers.

Each piece of software includes instructions on whether you need to unzip the file before installing it, and most also include README files. A complete list of software on this month's discs appears on the CD cover.

The CDs were created in HTML. You do not need any special software to access them other than a standard browser. The CDs were tested using Netscape Navigator 3.0 and 4.0, and Microsoft Internet Explorer 3.0 and 4.0.

All software on the CDs is provided as is, without any warranty, express or implied. Complete terms and conditions are included on the CD; click on the Conditions of Use link for details.

## How to run the CDs

Before using the CDs, please read the Conditions of Use online at **apcmag.com** under CDs. These CDs use an Autorun feature for Windows 95, 98 and NT systems. Just insert a cover CD and your browser will automatically load with the *APC* CD front page. Users of other platforms can launch their favourite browser and load the file DEFAULT.HTM in the root directory of the CD. For further information, see the instructions on the back of the CD insert.

You should carefully read the licensing agreements and honour any evaluation or shareware terms specified, read all instructions and README files, and virus check every program before use.

While *APC* has taken every care to ensure that the software provided is useful and that it works, we cannot accept responsibility or liability for any of the products included.

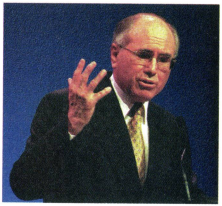
If you have any problems, refer to the Help section on the back of the CD insert.

# Government pins re-election hopes on IT

Technology has become a key issue in this year's federal election, with both the Howard Government and the Opposition announcing plans to boost Australia's flagging technology research sector.

The government has made new technology the central plank of a $3 billion education and research package, and the Opposition has laid out a plan to establish an online university. This policy debate marks the beginning of campaigning for the federal election, which the Prime Minister has signalled will be held before the end of the year.

The government plans to pump an extra $736.4 million into Australian Research Council grants and provide a $460 million boost to R&D tax concessions for business. A 'premium rate' of 175% will be introduced for new R&D projects that meet strict criteria, but the existing 125% rate will be maintained for other research.



The fruits of the funding injection will not be seen for several years. Of the total $2.9 billion to be spent over the next five years, only $159 million will be spent in the 2001/02 financial year and almost one-third of the funds will not be spent until the 2005/06 financial year. For the last 12 months, the government has refused to commit funds to its broad Innovation Statement, and a large part of the final package is made up of previous election promises.

The Opposition has accused the Prime Minister of trying to "catch up" on past funding cuts of $5 billion from research and education projects over the last five years. Howard cut the 150% R&D tax concession when he came to power in 1996, claiming businesses were using it as a loophole. Since then, Australian industry has slashed spending on R&D.

Business and academic leaders largely welcomed the funding package (tagged Backing Australia's Ability), but many criticised the government for not going further and questioned whether the tax concessions will help technology startups.

Industry, science and resources minister Nick Minchin estimates the $2.9 billion in government spending will lead to another $6 billion in private sector funding for R&D projects. He acknowledged that not all of this would be new funding. The bulk of the public funds are devoted to enticing industry dollars into R&D. "The 125% R&D tax concession will continue to be the government's principal support mechanism for business R&D in Australia," Minchin said. He added that the success of the policy depends on its reception by business.

The policy is also skewed in favour of research and education projects with money-making potential. Almost $79 million will be set aside to commercialise university and public sector research. The government also plans to set up a $129.5 million Information and Communications Technology (ICT) Centre of Excellence. No details have been finalised, but the government has said it will only fund research with commercial applications.

To address the IT skills shortage, the government will relax visa entry requirements for qualified IT professionals. The changes to entry requirements are designed to give students with Australian ICT degrees easier access to permanent residency.

At the same time, the government will encourage more Australian university students to study IT, maths and science under a $151 million plan to create 21,000 new university places in these disciplines. Another $130 million will be spent encouraging school students to study the same subjects.

Almost $1 billion has also been flagged for a student loan scheme for postgraduate students. Fees for postgraduate coursework have risen dramatically over the last five years to cope with government cutbacks.

A week before the government policy was announced, the Opposition put forward a plan to use the Internet to slash the cost of delivering higher education. As part of Labor's Knowledge Nation policy, a plan to establish an Australian Online University (AOU) has been announced. No costings or details of the plan have been released.

## News contents

### Top news this month


| | |
|---|---|
| Java dispute resolved | 14 |
| Gateway blasted over pricing | 14 |
| Download hogs beware | 14 |
| Bank invests in PC and Net company | 14 |
| Online medical records | 14 |
| Corel's Linux arm to go | 16 |
| Microsoft, Apple rethink OSes | 16 |
| Aussies escape auction hikes | 16 |
| Sega scraps Dreamcast | 16 |
| Hard lesson for Telstra | 16 |
| Movie moves make Yanks nervous | 18 |
| PC prices to fall | 18 |
| Former Spike head goes pop | 18 |
| Ad figures unreliable | 18 |
| Intel strikes back | 18 |
| Surviving the etail game | 20 |
| Domain debate comes down under | 22 |


Opposition leader Kim Beazley claims AOU will create 100,000 new undergraduate places a year by 2010, and AOU students will only pay half the course fees of other undergraduate degrees. AOU will also provide free preparation courses to encourage more people to enrol in higher education. AOU will offer courses and degrees from established universities, but students enrolled in units across different universities will be awarded their degree from AOU.

*Fiona Angus*

### Protestors storm policy launch

A small group of students invaded a luncheon staged by the Prime Minister to sell his innovation policy to industry leaders. Around 500 guests from business and academia looked on as security ejected the small but vocal group.

"This is small compensation for the cuts made to higher education under the Howard Government," Leah Freedman from the University of Sydney Students' Representative Council said. According to Freedman, the policy will allow large corporations to manipulate university curriculum content and direct what students are able to study.

# News roundup

## Download hogs beware

Telstra has followed Optus's lead and begun disconnecting cable Internet users who use too much bandwidth. The carrier has confirmed that some BigPond customers have been suspended, but won't say how many. The policy applies to customers on BigPond's flat-rate Freedom Plan. Telstra has provided Freedom Plan customers with a monitor that gauges Net usage with green, amber or red warning lights. No specific limits have been set, but Telstra says it will warn anyone in the top percentage of downloaders.

## Bank invests in PC and Net company

St George Bank has paid $18 million for a 5% stake in PC and Internet reseller Virtual Communities. Virtual Communities markets low-cost Internet and PC packages to members of community organisations such as football clubs, the Australian Council of Trade Unions and the Catholic Church. The deal values Virtual Communities at $360 million. St George also has the option to purchase another 5%, with board representation. According to St George chief executive officer Ed O'Neal, the bank will market financial services to Virtual Communities's 200,000 Internet subscribers.

## Online medical records

NSW medical records may be recorded electronically within two years under plans discussed by Premier Bob Carr. NSW Health Minister Craig Knowles said patients could specify whether records be kept on a central database or as a hard copy. The system would be accessible from hospitals and doctor's surgeries and some believe this would result in fewer errors and faster treatment. However, the Australian Medical Association and other groups are concerned that sensitive medical records might inadvertently be exposed.

# Java dispute resolved

The long-running legal dispute between Sun and Microsoft over Java has finally ended. Microsoft has agreed to pay Sun $US20 million and phase out its use of the technology in Windows and other products over a seven-year period.

Announced in January, the settlement means that Microsoft is no longer allowed to describe its products as 'Java compatible'. Its licensing agreement for Java has been terminated, but existing Microsoft products that include Java technologies can continue using them for seven years.

"The community wants one Java technology: one brand, one process and one great platform," Sun CEO Scott McNealy said in a statement following the settlement. Microsoft officials were also pleased. "This settlement will not impact on our customers or current products in any way and will allow us to focus our time and resources on what we do best: developing great software," Microsoft deputy general counsel Tom Burt said.

When Sun first introduced Java, gaining the support of Microsoft was seen as critical to broad acceptance of the technology. Microsoft officially licensed Java in 1996. However, Sun soon took Microsoft to court, claiming that the implementation of Java (its 'write once, run anywhere' programming language) included technologies designed to ensure applications would only run within Windows, rather than in a wide range of environments. The 1997 lawsuit sought compensation of up to $35 million.

Microsoft is already encouraging its developer community to abandon its J++ development environment for Java in favour of C# ('C sharp'), the modified version of C++ that forms a cornerstone of Microsoft's .NET environment (see pages 24 and 107). The company has announced a scheme known as JUMP (Java Users Migration Path) to help developers make the move, but it's not expected to take off commercially until the end of 2001. Java support will still be available in Internet Explorer, so many developers will be able to continue deploying Java applications on Windows desktops.

Some analysts think that debate over development environments could become irrelevant as XML (Extensible Markup Language) takes on a central role in translating data between different applications. In a brief on the settlement, Forrester Research said, "The settlement reflects market reality: the war between Java and Microsoft's COM is over. The new war is about building Net apps that connect via XML."

*Angus Kidman*

# Gateway blasted over pricing

Gateway has been forced to repay almost $30,000 to customers after falling foul of the Australian Consumer and Competition Commission (ACCC). The PC giant was reprimanded for misleading consumers about computer hardware price reductions created by the Federal Government's new tax system.

In May last year, Gateway ran an advertising campaign promising savings 'before the GST'. According to the watchdog, the ads could have misled consumers to think hardware prices were about to rise as a result of the GST when prices were actually expected to fall. Under the new tax system, the 22% wholesale sales tax on computer hardware was replaced with a 10% GST. The ACCC ruled that Gateway should have offered larger savings than advertised after the introduction of the GST.

"Consumers may have been misled that prices would be higher after the introduction of the GST than advertised in the May promotion," acting ACCC chairperson Rod Shogren said. Consumers who purchased two models during the promotional period will receive a refund of up to $200, depending on which model they purchased. "This amount represents the difference between the advertised May promotional price and the price of the computers immediately after the introduction of the GST," he said.

The ACCC has also cracked down on a scheme by computer retailer Info4pc.com to sell low-cost PCs. Info4pc.com offered PCs for just $299 if buyers agreed to provide details about personal lifestyle information for two years. Info4PC.com intended to sell the information as market research. However, investigations found the income generated by selling the market research would not cover the cost of the hardware.

The ACCC obtained a Federal Court interim injunction to prevent Info4PC.com from advertising and accepting orders. The ACCC alleges that most of the 3,000 people who paid for PCs have not received them.

*Fiona Angus*

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# News roundup

## Aussies escape auction hikes

Costs for online auctions are going up, but Australian bidders look set to escape a recent round of price rises. In the US, Yahoo has abandoned free listings for sellers, and eBay has introduced price rises across the board for the first time in four years. Neither of these changes is likely to affect local operations, as Australian pricing policies are established separately. eBay Australia only began charging listing fees last year, well after the scheduled date. The price rises come despite both companies posting profits.

## Sega scraps Dreamcast

After scrapping production of its own rival console, the Dreamcast, Sega is making games for Sony's PlayStation2. Difficulties selling the machine, as well as piracy problems and continuing losses, have seen the long-time games company shift focus from hardware to games publishing. The company is also reported to be in talks to bring its games to Nintendo's handheld Game Boy Advance and upcoming GameCube, as well as Microsoft's much-hyped Xbox. Sega has licensed the rights to have its games incorporated into a digital video recorder and is investigating possibilities for bringing Dreamcast games to the PC.

## Hard lesson for Telstra

Telstra has entered the online education market with a deal struck with government education publisher The Curriculum Corporation. The Telstra Easy2Learn venture will offer schools and households basic spelling and maths games designed for children aged six to 13. In January, The Curriculum Corporation took control of education Web sites owned by struggling online education provider worldschool. The Curriculum Corporation has agreed to run the site for the next five years and will take 60% of any revenue generated by it. After off-loading its online education venture, worldschool paid $3.3 million to buy a financial auditing firm.

# Corel's Linux arm to go

Corel looks set to sell its Linux division, and investigate ways to incorporate Microsoft's .NET technology into its products. Facing a third-quarter loss of $US10.7 million, the company is close to selling its Linux arm to investment company Global Linux Partners (GLP) for $US5 million. Corel will retain a 20% stake in the business, and will continue to make Linux software, including WordPerfect Office for Linux and CorelDRAW for Linux.

The sale of Corel's Linux business has been discussed publicly since last November. Linux software was once said to be an important weapon in Corel's defence against Microsofts Office. Along with WordPerfect for Linux, Corel distributed its own version of the Linux operating system for desktop computers.

In an attempt to regain profitability, Corel will return to its roots: graphics software. A priority will be convincing customers to upgrade to the latest versions of CorelDRAW and other graphics tools.

Last year, Microsoft also invested $US135 million in Corel, under the condition that Corel back its .NET Framework — a strategy that sees software as a service that can be delivered over the Internet. Corel is also keen to investigate Web graphics, a market dominated by products such as Macromedia's Flash and Shockwave tools. The company says it is taking steps to "transform" its graphics tools for the Web.

"Our creative product line provides fertile ground for growth, in both the short and long term," CEO Derek Burney said. He claims Corel can return to profitability by September this year.

Microsoft has been encouraging the programming community to support .NET at its worldwide Teched conferences. Microsoft is also working on tools to allow Java developers to write software to suit .NET, including one that converts Java code into Microsoft's own language, C#.

*William Maher*

# Microsoft, Apple rethink OSes

Microsoft and Apple have both instituted last-minute changes to their latest operating systems. Microsoft has changed the name of its new operating system from Windows Whistler to Windows XP (experience). According to reports, Microsoft is designing a new graphical user interface for XP called Luna, which will be based on Microsoft's .NET strategy.

The latest version of Internet Explorer is also rumoured to be undergoing a facelift in line with Luna. A preliminary version of Internet Explorer 6 was posted on the Web by rebel beta testers, revealing that Microsoft is attempting to integrate other Microsoft software products into the browser. Internet Explorer 6 will be bundled with Whistler and is due to be released later this year. Microsoft claims it's the biggest change to Windows since Windows 95.

Meanwhile, Apple has bowed to pressure from Mac users and backtracked on some of the more radical changes to its latest OS. Since public beta testing began last September, 75,000 of the 100,000 people who purchased a copy of the preliminary software have submitted feedback.

Apple chief executive Steve Jobs unveiled the changes to OS X at the MacWorld conference in San Francisco in January. OS X shocked many by blocking



direct access to the desktop, and by introducing a tightly structured Finder. In the final version to be released on March 24, Apple has made room for people to customise the Finder, and reinstated limited access to the desktop.

A revised Apple menu has also been reinstated to its previous position at the far left of screen, and will include basic functions such as Restart, Shut Down and Preferences. The clock has also made a return to the toolbar after being relegated to the Dock. Acting on widespread complaints that the Dock was unwieldy, Apple has brought back pop-up menus similar to those first introduced in OS 8 in the Control Strip.

*Fiona Angus*




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# News roundup

## Former Spike head goes pop

Old dot com CEOs never die, they just go and work for obscure Japanese multimedia companies run by '80s playboy pop stars. Chris O'Hanlon, the flamboyant former head of listed Web design company Spike Wireless, has taken up the position of chief executive at Syn, a Tokyo-based company founded by Simon LeBon, lead singer of '80s pop band Duran Duran. O'Hanlon quit Spike in April last year amid accusations of disorganisation and mismanagement, and allegations that he sexually harassed an employee in the company's online radio outfit.

## Ad figures unreliable

Internet advertisers are frustrated by inaccurate audience measurements, according to the Internet Industry Association. The group has formed a taskforce that will work on an official standard for measuring audiences for Internet advertising. The Australian Association of National Advertisers predicts a set of principles could be agreed on by mid-year. Audience measurements are notoriously unreliable because Web browsers often download or refresh the same site several times. Audience figures are also inflated by automated search engines, which visit sites for cataloguing purposes.

## Intel strikes back

Just as Transmeta's low-power Crusoe processor is being taken up in products such as Sony's Vaio notebook, Intel has announced its own power-saving chip. New 500MHz chips use only about half a watt of power in battery mode, instead of 1.1 volts. The technique saves battery life, but it also reduces processor speed to 300MHz, so applications run significantly slower. Intel is planning to release another "ultra low power" 500MHz Celeron chip, and Transmeta has said it will release a new chip with even lower power usage later this year.

# Movie moves make Yanks nervous

Australia's growing expertise in the technologies often required to produce special effects-laden blockbuster movies is posing a real threat to the US film industry, according to *The Migration of U.S. Film and Television Production*, a new report from the US Department of Commerce.

"Runaway film production has affected thousands of workers in industries ranging from computer graphics to construction workers and caterers," said commerce secretary Norman Mineta. Like Canada, the UK and Ireland, Australia ranks as a key location for US offshore movie production.



The report acknowledges that lower labour costs are a key factor in choosing Australia, but the "availability of highly skilled technical workers" was also singled out as an incentive for choosing facilities such as Fox Studios in Sydney or Warner Bros on the Gold Coast. Successful US movies produced in Australia include *The Matrix*, *Mission Impossible 2* and *The Thin Red Line*. *Star Wars 2* has also been filmed largely in Sydney.

New technologies that eliminate the problems associated with Australia's remote location have helped Australia become more popular for movie making. "Today's 'box' environments do not require the same technical, physical infrastructure as the large post-production facilities that are becoming increasingly outdated," the report said. "In fact, the 'box' environments are remarkable for the ease with which data can be transported over long distances and the ease with which specialists working on different aspects of the post-production process can collaborate over long distances." Companies seeking to rush-release titles can also take advantage of the time difference between Australia and the US to effectively double their work rate by having local production houses produce work which is then ready for review when the US working day begins.

The report estimates that the total loss to the US economy of overseas film production could be as much as $US10 billion a year. In the past six years, overseas production has increased by 55%, fuelled by lower costs and incentives offered by overseas governments.

***Angus Kidman***

# PC prices to fall

Researchers have predicted a cut in PC prices as vendors try to clear excess stock after a disappointing Christmas sale period. Gartner Dataquest reports Australian PC shipments fell by 18% in the fourth quarter of 2000 as consumers put off new PC purchases in favour of cheaper items. "The traditional boost in Christmas buying did not materialise," Gartner Dataquest analyst Andy Woo said.

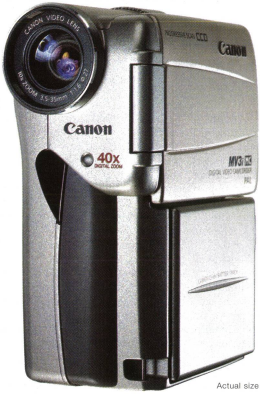
Big name manufacturers were among the hardest hit by the trend. Dell saw its quarterly market share of shipments drop 24% from the previous year, and Apple's market share for the fourth quarter dropped 13%. Overall, PC shipments were 11% lower than the same quarter in 1999. Woo claims prices will have to be "slashed" to clear stock. "Consumers can expect bargains during the first quarter of 2001."

A host of economic factors have been blamed for the slump in spending, including exchange rate fluctuations, negative reports about the US PC market, the lingering effects of the Olympics in Australia and rising petrol prices. Global PC shipments for the fourth quarter increased by 10% over the 1999 period, but that wasn't enough to prevent Apple, Microsoft, Dell and Intel posting lower-than-expected earnings for the quarter.

These companies depend on PC owners regularly upgrading their machines. If Gartner is right, consumers appear less inclined to pay extra for faster machines. Research firm IDC reported similar findings. It found that worldwide PC sales increased by 9.2% in the last few months of 2000, less than half the increase it had forecast.

Gartner estimates that PC makers sold a total of 134.7 million units in 2000, an increase of 14.5% on 1999 shipments. In 1998, PC shipments topped 90 million.

***William Maher***




Actual size

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*Online retailing is still struggling, with a rash of recent sackings the most recent symptom.*

# Surviving the etail game

Almost a year after tech stocks began their sharp nosedive, market researchers are busy reassuring Australian businesses that Internet retailing has a practical future.

Ernst & Young's *Online Retailing* report, published in January, claims Web retailing is "alive and kicking" in Australia. Based on a survey of 997 participants, the report claims that the average Web shopper spends up to $1,500 annually. Seventeen percent of respondents, said they had spent $1,900 or more online in the previous year.

Nevertheless, Web retailers have taken a battering in the past year — a fact documented by *APC*. Ecommerce may be "alive and kicking", but for those companies that survived last year's tech stock crash, survival is now a lot tougher.

One such company is OzBooks.com, an Australian Internet startup that appeared in late 1998. Claiming to be Australia's answer to Amazon, CEO Raphael de Montero predicted the site would beat overseas competitors with faster delivery and lower prices.

While de Montero puts on a brave face, he admits it hasn't been a smooth ride. In fact, apart from a "very small" seed investment, the entire operation has been run without any funding.

Not that de Montero hasn't tried. He began his first major effort to secure venture capital just as the Nasdaq and other technology stocks plummeted in April 2000. He visited 12 potential investors, but no-one agreed to a deal.

"It was the worst time to look for venture capital. They were all very polite, but who would have invested at that time?" he said.

At the time, de Montero hoped to raise $5 million through venture capital funding. He even considered floating the company if funding could be secured. "It means you are not going to disappear overnight. It gives you some respectability," he said then.

A year on and de Montero's perspective is very different. Today he is unsure OzBooks could meet the requirements for listing on the Australian Stock Exchange. He is also pessimistic about venture capital, claiming many investment groups and advisors ignore even basic business principles.

"The venture capital equation consumed an incredible amount of time for me. It's full of people that are too greedy. A lot of people are interested in making a quick killing, but they're not interested in the company," he told *APC*.

In one instance, an investment advisor said he could raise $10 million within a month for de Montero, without seeing cash flow figures from the OzBooks site. "I insisted he look at my cash flow, but he said it wasn't necessary," de Montero said.

Left feeling "very skeptical" about investment funds, de Montero has been running OzBooks for almost 12 months without any funding. The company has only nine staff and de Montero keeps a tight rein on expenses. Unlike many high profile Internet companies, OzBooks press material and publicity is now handled inhouse by de Montero himself.

**Dot com dismissals at a glance**

| Company | Sacked |
|---|---|
| Wine Planet | 5 |
| Chaos Music | 8 |
| dstore.com.au | 15 |
| ehyou.com | 20 |
| RushTV | At least 20 |
| Oven Digital | 25 |
| Bullant | 29 |
| News Interactive | Up to 50 |
| AltaVista | 200 |
| LookSmart | 31% of workforce |
| Amazon.com | 1,300 |
| Time Warner | 2,400 |

"We constantly check the bottom line. It's being run as a very tight business. Whenever we spend, we wonder whether we will see the money again," he said.

At the time of writing, the company's only source of income was the OzBooks site. De Montero would not reveal earnings, saying only that the site is "not making millions".

Despite being on a tight budget, de Montero has added online computer store OzHitech.com to his portfolio. The site sells new PCs, software and accessories from suppliers Ingram Micro, Express Data and Tech Pacific. A music site selling CDs and DVDs is also planned for the near future.

De Montero has also formed Hilroy Technologies, a Web site development company based in India. The company employs five staff who were responsible for building the OzHitech site.

Within nine months, de Montero hopes Hilroy Technologies will begin making Web sites for other clients, as well as building foreign versions of OzGlobal sites. He also anticipates the company will branch into software development.

Other dot coms have not been so lucky. In the past year, a growing number of high-profile technology companies have announced major retrenchments, including shopping site dstore.com.au, which retrenched 15 staff after being sold to clothing retailer Harris Scarfe for $3 million. Local rival TheSpot also collapsed last year and sold out to David Jones.

In January, the Australian owner of music site mp3.com.au, ehyou.com, announced it was cutting one-third of its staff, while software company Bullant revealed it was sacking 29 staff. All-Advantage.com, the company that paid members to surf using its advertising-carrying software, was also shutting down its Australian office at the time of writing.

The sackings continued in late January, with News Ltd cutting about a third of staff in its local online division; about 50 people were expected to lose their jobs. Another 25 people lost jobs that month when Web designer Oven Digital closed owing debts to staff, the Australian Tax Office and creditors.

Overseas, even the industry's biggest players have been affected by layoffs. In January, LookSmart announced plans to retrench 31% of its workforce. Other sites to announce sackings include search engine AltaVista, shopfront Amazon.com and global media giant AOL Time Warner.

Despite the gloomy outlook, de Montero is convinced the Web holds lucrative returns for those prepared to wait. However, he disagrees that business on the Internet necessarily involves a high cash burn rate.

"The idea that you have to lose money to make money on the Internet is wrong. You have to make a profit to survive," he told *APC*.

***William Maher***




Actual size

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*Despite new top-level domains and new rules, debate continues over the best way to allocate names online.*

# Domain debate comes down under

In March, Australia will play host to the ongoing debate over Internet domain names when ICANN (Internet Corporation for Assigned Names and Numbers), the international body charged with developing new polices and top-level domains, holds a key board meeting in Melbourne.

The ICANN meeting comes at a critical time for the group. It will take place from March 10 to 13 at the Melbourne Convention Centre, and is open to members of the public. Last November, ICANN fulfilled one of its key goals when it announced seven new top-level domains (TLDs), including .biz, .name and .pro. New TLDs have been introduced to eliminate overcrowding in popular domains such as .com, which have seen available names dwindle as potentially lucrative ones are bagged by cybersquatters.

The meeting will be the first major gathering since the announcement of the new TLDs, and ICANN will be hoping to see at least some of those domains officially approved and made available to consumers. This would provide a further boost for Melbourne IT, the local domain registration company that has won the right to operate registration services for the .biz domain. It would also put a stop to companies that have been offering 'pre-registration' of domain names using the new TLDs. According to ICANN, this pre-registration carries no official status.

The ICANN meeting marks the final official function of outgoing CEO Mike Roberts, who has headed the organisation since October 1998. His role is being taken over by M Stuart Lynn, the former chief information officer for the University of California.

ICANN is currently open to all Internet users. The question of how ICANN's 'at large' membership is constituted will also be debated at the meeting. As its policies have worldwide impact, ICANN has actively sought to promote global membership, but this has produced mixed results. Attracting votes from regions without an established high-tech presence has proved particularly difficult. In an election last year for global representatives, only 130 votes were cast in the African region elections. In contrast, the US leg was so tightly contested that all six rounds were exhausted before a winner was announced. About 76,000 members were eligible to vote in the elections. The African region election outcome leaves ICANN open to charges of first-world bias, something it is keen to avoid.

ICANN is now conducting a review of its 'at large' membership under the direction of former Swedish Prime Minister Carl Bildt. "The Board's approval of the Study



Committee and Carl Bildt's selection as Chair is a demonstration of ICANN's commitment to finding an effective way for the perspectives of individuals in every country to be heard and given due consideration," ICANN chairperson Vint Cerf said.

"ICANN's actions affect all of the world's Internet users, and I look forward to the challenging task of forging a consensus on the best method for representing this ever-growing constituency," Bildt said.

## Local moves

Policies for the allocation of domain names in Australia are also continuing to develop under the direction of auDA (the .au Domain Administration). In January, auDA took over the running and maintenance of the central AUNIC (Australian Network Information Centre) database from Australian Internet founding identity Geoff Huston. The database holds the details of all local domain name owners. Huston was reportedly paid $20,000 for the database, which he created when the Internet was first established locally.

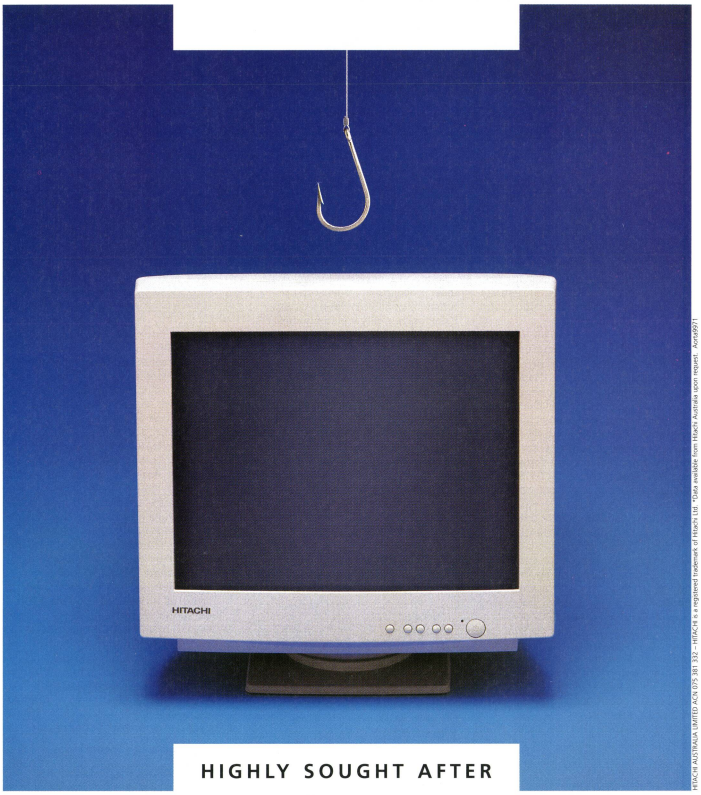
Despite the importance of having a transparent process for domain name registration, the centralised storage of domain name data has become a controversial issue. Last year, the AUNIC database had to be modified to make it impossible to request the details of all domain name holders in a single search. The data was being used by mass marketing companies looking for email addresses.

The introduction of limited competition into the .com.au domain space has also led to problems. Melbourne IT's Internet Names Australia division still holds an exclusive licence to register these names, but allows other businesses to resell that service. Some of those businesses are actively targeting companies whose names are up for renewal, in some instances sending official-looking invoices for domain name renewal to customers who previously registered with another service provider. Information on when domain names expire is freely available from the AUNIC database.

The auDA and the Australian Competition and Consumer Commission (ACCC) issued warnings in late January, advising businesses and individuals to be wary of such practices. "You should carefully check the rates and terms and conditions of the renewal and compare this with the current provider of your domain name," auDA CEO Chris Disspain said. "Do not assume that any renewal letter or invoice is from your original supplier."

The ACCC took an even stronger line. "A number of companies are now offering domain name renewal services in the .com.au domain space, which may lead to confusion among consumers," ACCC chairperson Professor Allan Fels said. "Suppliers of domain name renewal services are warned not to mislead customers as to their need to renew their domain name licence with a particular supplier, as such conduct may breach Part V of the Trade Practices Act."

***Angus Kidman***




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# The .NET result

*As part of its all-encompassing .NET initiative, Microsoft has unveiled Beta 1 of the Visual Studio.NET development suite. It offers programmers many advantages, but there is also a downside.*

## The .NET strategy

Visual Studio.NET consists of Visual C++, Visual Basic.NET, Visual FoxPro, Visual SourceSafe, and a newcomer, Visual C# ('C sharp'). The suite contains many new features, but it is primarily an entirely re-engineered product sitting atop Microsoft's .NET strategy.

.NET is the result of two projects. The goal of the first was to improve Windows's development capability, specifically COM, Microsoft's Component Object Model. The second project aimed at creating a platform for delivering software as a service. These projects merged, forming .NET, which introduces the concept of Web services. These are loosely coupled applications and components designed for diverse computing landscapes that communicate using standard Internet protocols.

Visual Studio.NET has been designed for the authoring of distributed .NET applications and to provide all of the services needed to produce enterprise-level solutions. This includes an object request broker, transaction-processing monitor, scripting engines, messaging support, database connectivity and security. It uses existing Internet standard protocols to provide a consistent and unified programming model for broad-reaching Web-based clients, as well as rich client interfaces and emerging smart devices. In management terms, .NET means three things.

First, programs can be made from services accessed across the Internet. Programmers familiar with COM and DCOM (Distributed Component Object Model) are familiar with the problems involved in deploying and managing remote objects. .NET has solved many of these problems. Programs can use functions at different Web sites as if the functionality is built into the program. There is no requirement to register a DLL or to write cryptic declarations to access these functions. Using Visual Studio.NET's built-in service explorer, you can browse Web sites for services to embed into your programs. Think of this as RAD (rapid application development) for the server — just browse, then drag-and-drop server-side services. For example, an airline might provide a service to look up flight times for a destination. A hotel mightprovide a service to check if rooms are free on a given night. You can write a travel application that pieces these two services together.

Second, data is encoded in XML. Programs don't need any foreknowledge of the type of data they will receive because it is now self-describing. The structure of the data, as well as the data itself, is sent between services.

Third, .NET targets the full range of client devices: PCs, Web browsers, PDAs and mobile phones. Your travel application can be ported easily to a pure Web application, a rich PC-based program, or even to a PDA or other device.



▲ A simple C++ function

Visual Basic.NET (VB.NET) also provides multithreaded applications, structured exception handling (try...catch), method overriding, namespaces and the ability to initialise variables when they are defined.

If all this sounds very like C++, it should; Microsoft has put together the best features of each individual language in Visual Studio. The syntax will always be Basic, but the expressiveness and functionality that is possible in C++ is now available in VB.NET.

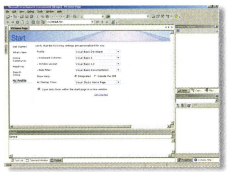
The languages are all designed to work together. You can even inherit a standard form in a Visual C++ or Visual C# application, overriding functions as necessary. The languages blend seamlessly.

Microsoft has also integrated the targeting of languages. You may have noticed that no reference has been made to Visual InterDev. That's because it is no longer required. Visual Studio.NET contains two forms packages: Windows Forms and Web Forms. The traditional PC-based Visual Basic program uses Windows Forms, which are typical drag-and-drop components such as checkboxes and command buttons.

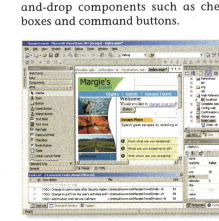
## Languages

Visual Studio.NET has a new language, C#. It is which is based on C++, but is very different. For example, it has namespace imports, exclusive case statements, System classes and many other Java-like features.

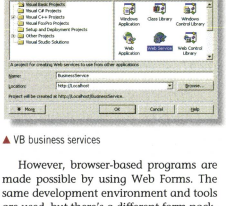
Visual Studio.NET has tremendous value as an upgrade for Visual Basic (VB) programmers. It offers object-oriented features such as inheritance. For instance, if you use a standard for your forms, you can create it once and inherit it each time you make a new form. Your customisations are automatically applied.



▲ Visual Studio's start page



▲ Shared Web designer




▲ VB business services

However, browser-based programs are made possible by using Web Forms. The same development environment and tools are used, but there's a different form package. This is known as ASP.NET (or aspx) and any of the Visual Studio.NET languages, particularly C#, can be used. Also, whereas existing ASP programs intersperse program commands with HTML output, ASP.NET divides form and function into two separate files. For example, it is now possible to have a graphic designer create the Web page and a programmer implement the underlying functions. Each can work on their files, or modify them, without impacting on the other.

All these features combine to make Visual Studio.NET a great entry point for new programmers and a great upgrade for experienced Visual Studio programmers. Previously, languages were more suited to specific tasks. Now, all languages are equally suitable, and they all work with each other using cross-language inheritance or debugging, running locally or on remote computers.

The development environment has been vastly improved. Visual components now have two properties that will be familiar to Delphi 4/5 programmers: Dock and Anchor. By setting the Dock property, any control can be turned into a floating toolbar and then redocked onto the form. By using the Anchor property, any control can be glued to any combination of the form's borders. For example, a command button can be aligned with the bottom and right borders. If you stretch the form, your command button stays in the same relative position to these two borders. This property alone makes many form_resize events redundant, and programmers won't have to strive to keep the display consistent after a careless user has stretched all the dimensions.

The IDE (integrated development environment) now allows incremental searches as you type. It jumps from line to line to match your search word as it is built up — or shrunk, if you make a mistake and backspace over it.

Context-sensitive help is constantly available in a dockable window. There's no longer any need to scroll through a list of contents presenting VB, SQL and ADO suggestions for the term you requested. The IDE tracks the language you are using, and even your application type, to provide the right help at the right time in a convenient display. Form tab order and menubars can now be edited visually. This is similar to Delphi, but it's done in a novel way.

The clipboard now has an extensive history that permits clipboard cycling. You can cut and copy up to 12 times, and when it comes time to paste, you just cycle through using Ctrl-V to paste any of the saved clipboard items. You can even paste clipboard text onto a special menu and save code snippets for later use.

There are many other editor enhancements. For example, nonvisual components now have their own tray. This means you don't have to push all your common dialogs to the side of your window or set their left property to -2,000. Nonvisual components are all hidden safely off the form and deposited in their own location.

## Backward compatibility

Visual Basic.NET is a big improvement on Visual Basic. However, according to Microsoft, it isn't "100% backwards compatible". This is an understated way of saying that VB.NET is so radically different from VB that any sizable program needs modification to compile and run.

*APC* tested backward compatibility by opening a simple Visual Basic 6 program in Visual Studio.NET. The program had eight files, a fairly straightforward and conventional Windows interface, a Winsock control and Excel automation.

Visual Studio.NET took a whopping 30 minutes to migrate it to VB.NET. It generated 35 files, most of which were type libraries for the standard VB controls we'd used, such as the common dialog. The result? It certainly wasn't a working program. Instead, it presented an upgrade report of all the things we still needed to do.

Microsoft has released a guide to converting VB programs to VB.NET. If you use COM, you'll be pleased to know that VB.NET still works with it. You can port programs piece by piece. However, getting existing VB programs of any complexity to work in VB.NET is a big job. Microsoft might put more work into its migration wizard before final release.

By virtue of its maker, Visual Studio .NET will be a market leader in Windows development tools. Microsoft controls the Windows operating system that is going to embrace the .NET vision. This is the only development environment at present that can target .NET, so it is a must for developers who want to write for that platform.

However, Visual Studio.NET is a fine product in its own right. VB has been updated, and programs work equally well for PC or browser. It's suitable for new programmers, and experienced programmers will find many enhancements to make their work easier. However, migrating old code requires care.

*David Williams*

*David Williams attended a .NET reviewers' workshop in Seattle as a guest of Microsoft.*

***For more on the .NET initiative, see the Corporate IT feature on page 107.***

**Pros** Languages are interoperable
Writing and using Web services is easy
Many IDE enhancements

**Cons** Terrible VB backward compatibility

**Contact** Microsoft
**Phone** 13 20 58
**Online** www.microsoft.com/australia/msdn
**Price** $10.95 or free download for MSDN subscribers

## This month in First Take:

**VIDEO EDITOR**
Adobe Premiere 6 26

**PROCESSOR**
Via Cyrix III 28

**VIDEO CAPTURE CARD**
Pinnacle Studio VCD 30

**EMAIL READER**
LifeFX Facemail 30

**MP3 GADGETS**
Pretec DC-530 and Samsung SCH-M105 34

**DIGITAL MUSIC MANAGER**
Apple iTunes 36

**MICROPHONE**
Intel Play Sound Morpher 36

**CD-R SOFTWARE**
CD Stomper Click 'N Burn and Veritas MyCD Pro 38

# Adobe Premiere 6

Adobe Premiere is the most popular video application of its kind. It is as central to video as Photoshop is to graphics, and it's used by a range of professionals for creating corporate and wedding videos, presentation clips for tape, CD-ROM or the Web, and even budget music videos and TV commercials.

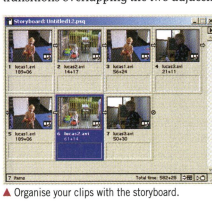
*APC* tested it on a Celeron 300A system with 128M of RAM and an Ultra DMA/100 7,200rpm 60G Maxtor drive, running Windows 2000. We also used a Swann FireWire card and Sony DSR-PD150P DV camera. The Celeron processor may be a bit slow by today's standards, but the speed and capacity of the hard drives (critical to video editing) were definitely up to the task.

The latest release of Premiere is designed for digital video (DV), and a comprehensive range of DV cameras from Sony, Panasonic, Canon, JVC, Thomson and Grundig are directly supported when setting up the system for capture. Analog capture cards are also still supported.

The source and preview windows have some useful improvements, such as title and action-safe overlays, and markers. However, as with previous versions, you need an external TV monitor to see what you're doing when working at full PAL size.

There are also some improvements to the software's ability to preview clips on discs, and to the way bins (project media libraries) are organised. The palettes are also better designed for audio and video effects. Some After Effects filters are now included, and Web output is improved with support for the built-in Microsoft and Real streaming media formats.

A major new feature is the single-track timeline. This gives the appearance of a single video track with transitions overlapping the two adjacent clips. This approach is used in lower-end consumer video software, such as Ulead VideoStudio, as well as professional gear, because it's easy to use.



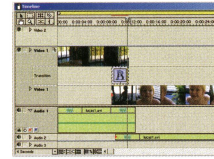
▲ Organise your clips with the storyboard.

However, Premiere's attempt at this is not as effective as it could be. You can drag a transition directly onto a pair of adjacent clips for quick application, but you can't simply bump the two clips together to create a quick cross-fade as you can in Vegas Video.

Also borrowed from other tools is the storyboard view. This is like a staging area for organising clips in your project. For simple projects, the storyboard can be used as an alternative to the timeline, or as a quick way to lay out your shots before moving them into the timeline for finetuning.



▲ You can adjust capture settings easily.



▲ Premiere 6's new timeline feature is disappointing.

Another new inclusion is the ability to split or join video/audio tracks more easily with the new Toggle Sync Mode button at the bottom of the timeline. New tracks can now be created by dragging a clip onto the timeline, so you don't have to manually open a dialog and create the track first. Replacing transitions is also easier as you can drop a new one over the old, and video effects can now be altered over time by adding keyframes to a clip directly in the timeline.



▲ Mix audio in real time with the new audio mixer.

One important new feature is the audio mixer. This long-overdue control offers VU meters, gain, pan, mute and solo for every track, so you can mix your audio in real time as you watch the video. You can also record automation data for volume and pan, so as you drag the controls the movement will be remembered and played back next time. This is very good, but packages such as Vegas Video integrate the audio mixing and effects better. Premiere now supports DirectX audio plug-ins, but audio filters must be applied in the timeline, not from the mixer.

Some new features are already standard in other programs. These include commands such as Open in Original to edit media in the program it was created in, a history palette, the ability to remember where you last loaded a file from, and a recent project list on the File menu for quick loading.

Overall, Premiere 6 is a good upgrade, and if you are working with DV it's a crucial one. However, it's the little things that determine how you work in the program, rather than the big new features. Premiere is highly regarded because, like Photoshop, it's a robust professional tool. Version 6 continues this tradition.

***Philip Moore***

**Pros** **Full DV support and storyboard editor**
**Improved audio handling**

**Cons** **New single-track timeline inadequate**
**Real-time handling could be better**

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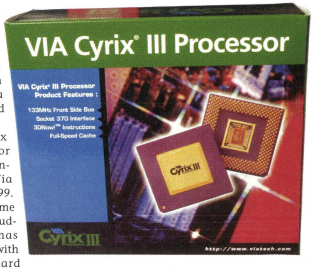
# Via Cyrix III

Cyrix was once considered a serious rival to AMD in the Intel cloning processor market, but the company has had a relatively low profile since it was sold off by National Semiconductor in August 1999. However, under the direction of new owner Via Technologies, Cyrix has recently re-entered the budget PC market with the Cyrix III.

AMD is competing directly with Intel in the top-end processor arena, but the Cyrix III is unashamedly targeted at the budget PC market, and its main competitors are Intel's Celeron and AMD's Duron. To date, no major PC manufacturer has signed up to use the chip, and Via has been focusing its promotional efforts on the small run white box market, where price is often a bigger consideration than performance.

*APC* tested the 667 and 600MHz models of the Cyrix III. A 650MHz model is also available and a 700MHz version is due for release early this year. By the end of the year, the company is planning to release an 800MHz version, and a 1GHz release is pencilled in for early 2002.

Despite the Cyrix branding, the processor uses elements of the Centaur technology that Via acquired from IDT in 1999. The chip features the same 370-pin socket as Intel's budget Celeron line, but has been designed to work with some older motherboard designs, so it can be used in ultra-cheap systems. The processor has a 128K level 1 cache and 100/133MHz frontside bus, and is built using a 0.18-micron manufacturing process.



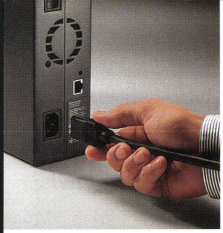

| Product | 667MHz Cyrix III | 600MHz Cyrix III |
|---|---|---|
| Contact | Protac | Protac |
| Phone | (02) 9637 8999 | (02) 9637 8999 |
| Online | www.cyrix.com | www.cyrix.com |
| Price | $199 | $164 |
| **Specifications** | | |
| Test system | Via Cyrix III 667MHz | Via Cyrix III 600MHz |
| Secondary cache | 128K | 128K |
| RAM and type (maximum) | 128M SDRAM | 128M SDRAM |
| Hard disk controller | Via bus master PCI IDE controller | Via bus master PCI IDE controller |
| Hard disk file system | FAT32 | FAT32 |
| Graphics card | WinFast GeForce2 GTS | WinFast GeForce2 GTS |
| Video bus type | AGP | AGP |
| Video RAM | 8M | 8M |
| Video controller chip | nVidia GeForce2 GTS | nVidia GeForce2 GTS |
| Monitor | N/A | N/A |
| Tested resolution /colour depth/refresh rate | 1,024 by 768/16 bit/85Hz | 1,024 by 768/16 bit/85Hz |
| **Benchmark results** | | |
| Business Graphics WinMark 99 | 182.7 | 172.7 |
| High-End Graphics WinMark 99 | 468.3 | 448.3 |
| Business Disk WinMark 99 | 1,973.3 | 2,103.3 |
| High-End Disk WinMark 99 | 3,913 | 3,863 |
| CPUmark 99 | 24 | 22.2 |
| FPU WinMark 99 | 1,006 | 996 |
| Business Winstone 99 | 21.9 | 20.3 |
| Expendable timedemo (lowest fps) | 14 | 11 |
| Expendable timedemo (average fps) | 25.5 | 22.4 |
| SYSmark2000 | 60 | 55 |

Benchmark scores for the processor in *APC* Lab tests were consistent with Cyrix's market position. They were acceptable considering the speed rating and onboard cache, but hardly outstanding when compared to the recent crop of 1GHz (and faster) chips. That said, some recent releases such as the Pentium 4 have failed to live up to expectations (see *APC* January, page 30).

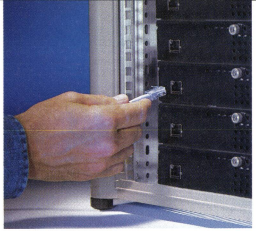
Compared with the performance AMD has managed to squeeze out of the Duron, the results for the Cyrix III were a little disappointing. Benchmark scores in both raw processor utilisation and real-world applications were well below the 700MHz Duron tested by First Take in September last year (see *APC* September 2000, page 34). For instance, the 667MHz Cyrix III scored a CPUmark 99 result of 24, compared to the Duron's 59.9 on a similarly configured system. As expected, the performance of the 600MHz was weaker than the 667MHz model, but it scored better in the disk benchmarking tests.

Ongoing price pressures on chip manufacturers and computer distributors mean that Via may face an uphill battle in establishing market share. Even big brand PC manufacturers are being forced to slash prices, so Via's chances of finding a new niche are slim. Nonetheless, if you're after a no-frills, budget processor, the Cyrix III is a reasonable alternative. If you're power hungry, you should look elsewhere.

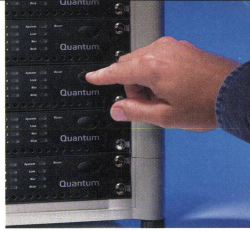
***Angus Kidman***



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CREAM 3636

# Pinnacle Studio VCD




Studio VCD is designed for making video CDs (VCDs) from external video sources. The basic kit comes with a video capture card with standard composite and S-Video inputs, as well as CinePlayer DVR for capturing video, CinePlayer Editor for editing it, and Nero 5.0 for burning it. There are no cables supplied, which is unusual for this sort of kit.

Hardware and software installation was a breeze. This was no thanks to the manual, which leaves a lot to be desired. Its two pages only briefly outline the mechanics of capturing, editing and writing your video. The built-in help files that come with some of the bundled software are also inadequate. CinePlayer DVR has no help file at all and relies on a Web page with a short FAQ.

When capturing through the composite video port from a VCR, video quality is average. The picture looks fine for standard video sequences, but flickers noticeably when large text is displayed onscreen. However, you can adjust brightness, colour, contrast and hue when capturing, which can make a huge difference to your video quality.

*APC* encountered a major problem with the audio synchronisation while capturing. We tested using an Athlon 900MHz with 256M of RAM and found that if you try to do anything — even just click on the desktop — a gap in the audio/video sync is created. Recording videos that are over an hour long also results in a slight audio sync problem, so if you have long videos, it's best to break them up at the capture stage.

CinePlayer Editor is good for basic video editing, but that's about it. There's nothing flashy in it, just the ability to crop clips and place them in a desired order. A demo version of Pinnacle's editing suite is provided, but it doesn't work for captures from the card.

The inclusion of Nero is a real bonus. This is an excellent piece of burning software with a retail price of $US69.95. You can use it to create VCDs, or for just about any burning operation.

Despite its shortcomings, this kit creates VCDs quite well. However, if you're looking for something more from your video capture card, you might want to go for something a bit more expensive.

Pinnacle has delivered good value for the price, and the included software is worth the money alone. So if you're a VCD fanatic looking for a low-cost card to fuel your addiction, Studio VCD might be right up your alley.

*Daniel Gardiner*

**Pros** Reasonable price
Does the basics well
**Cons** Poor audio synchronisation
Poor documentation

**Contact** Lakovision
**Phone** (03) 9852 7444
**Online** www.pinnaclesys.com
**Price** $219

# LifeFX Facemail




Facemail is the first product from LifeFX, a company whose mission statement says it aims to "provide the most believable, lifelike, stand-in virtual people to enhance and facilitate interaction, satisfaction and loyalty online". Facemail is a mail program with text-to-speech capabilities and a digitised, 'lifelike' bust to read out your emails to you.

It's a new program, so there are only five actors or stand-ins available for download, and all of them are included in the installation program. However, there will be many more available from the LifeFX 'digital gene pool' in the near future. To send Facemail you need to use the Facemail Web interface on the LifeFX Web site. Enter the email text and subject, and choose an actor to read out the email at the other end.

The mail arrives in the inbox with a generic 'you've received a Facemail' line and a URL to download the Facemail program so you can hear it. This is where you may run into problems. The Facemail download file is 7M, which may be a bit big for 56K modem users considering it's just an email. The actual message is a very small attachment to the email. Facemail is not a plug-in for your email program, but a separate program that runs alongside it.

The text-to-speech voices run from the Intel text-to-speech engine, and add a touch of the surreal to the email. The faces look human enough, and you can forgive the odd facial tic, but the monotonous computer-created speech lacks realism and undermines the whole effect. Then there are the emotions; those annoying smiley faces :) and sad faces :( that have come into use since the advent of the Net are now acted out in all their awful glory. At present there are five happy faces and five angry or sad faces, plus a range of frowns, kisses, surprised expressions and a couple of disgusted faces. They may not fit too well with whatever you've written, but it is amusing to watch the actors grunt and strain their way through the basic expressions.

Facemail is a novelty program, with a professional finish. There's plenty of room for improvement; better actors, more stages between expressions, a more lifelike speech engine, and a smaller download would be welcome. Future versions will apparently include some of these features, plus better AI and a real speech engine.

*Darren Ellis*

**Pros** Fun for a while
**Cons** Voices are monotonous
Lots of room for improvement

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**Phone** N/A
**Online** www.lifefx.com
**Price** Free download

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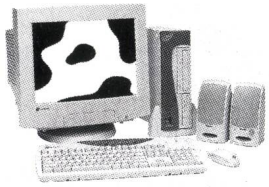
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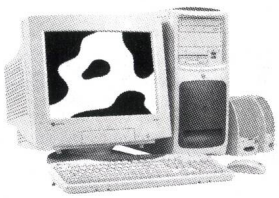
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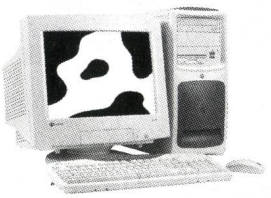
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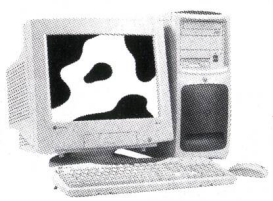
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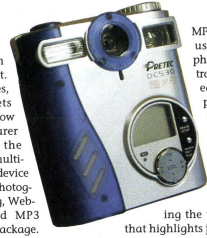
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GAD397/APC

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# Multifunction MP3 gadgets

## Pretec DC-530




MP3 devices are the in thing at the moment. MP3 watches, phones, PDAs — the list gets longer by the day. Now hardware manufacturer Pretec has joined the throng with its new multi-purpose DC-530. The device provides digital still photography, voice recording, Web-cam capability and MP3 playback, all in one package.

The complex internals are packaged in an attractive silver and blue casing, with controls that are surprisingly simple and understandable considering the complexity of the device.

The top panel sports a mode dial with settings for PC connect, audio, MP3, video out to TV, and camera. A shutter button and power switch complete the top panel. The only other controls are on the front panel: a couple of voice recorder buttons and a four-way rocker.

The rocker sits under a status LCD, and you can't see it while you are using the camera, which is not very handy. The rocker control sets functions like TV output, timer, flash, volume and track to play. A tiny microphone also sits under the LCD and captures plain WAV files to memory.

Power is supplied by a couple of AA alkaline batteries. There is a DC power-in socket under a flap next to the usual video and USB-out sockets. A 32M CompactFlash card sits under another flap on the right side and the camera has 2M of internal fixed memory. The lens is an f:2 fixed focus unit with a separate viewfinder and flash. There is no LCD image viewing screen.

Extra features include a mini tripod, a groovy PVC case, bud-style earphones, two CDs of MGI video/still imaging software, Sound Forge Siren MP3 ripping utilities and a front end upload manager utility. The included manual is about as handy as a chocolate teapot. Despite repeated attempts on several machines, *APC* was unable to get the USB video connection to work.

In terms of quality, the DC-530 is practical rather than impressive. Image quality is definitely Web-only at 640 by 480. The average size per shot is 50K to 60K, indicating the high degree of compression used. MP3 playback is reasonable using the supplied earphones, but no fast forward, track programming or audio equalisation features are provided. Recorded WAV audio was of poor quality and exceptionally quiet; it would only be suitable for recording notes, not conversations.

Overall, this is a brave attempt at making the ultimate gadget, but one that highlights just how tricky the task is.

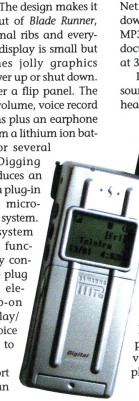
## Samsung SCH-M105

While we're on the 'MP3 with everything' subject, how about a phone that plays MP3 tracks? Electronics giant Samsung, not content with its MP3 camera (see *APC* January, page 74), has produced the SCH-M105 phone player. It's in competition with units such as the Ericsson HPM-10 (see *APC* December 2000, page 40), so we can probably expect every other phone maker to have a model out before long.

The SCH-M105 is a standard CDMA phone with the usual long battery life, voice-activated dialling, voice notes, phone book and SMS options. The design makes it look like something out of *Blade Runner*, with alloy finish, external ribs and everything squared off. The display is small but very clear and flashes jolly graphics onscreen when you power up or shut down. The keypad hides under a flip panel. The side of the unit houses volume, voice record and menu scroll buttons plus an earphone socket. Power comes from a lithium ion battery which is good for several hours of talk time. Digging deeper in the box produces an MP3 Manager CD and a plug-in external stereophone, microphone and control unit system.

The control unit system connects to playback functions through four tiny contacts moulded into the plug housing. The control element is a small clip-on dial, with buttons for play/stop, next/previous, voice record, volume, revert to phone and hold.

It has a parallel port cable which slots into an excruciatingly awkward connector on the bottom of the phone. The MP3 Manager software allows simple dragging-and-dropping of files into and out of the phone's memory, either from disk or off the Net. There is no ripper provided. It can download a range of file formats including MP3 (but not WMA) and text, image and document files. Transfer speed is passable at 30 seconds for an average track.




Playback provides excellent quality sound, if a little quiet, through the earbud headphones. It is instantly interrupted if a call comes in. Playing tracks drains the battery more than phone calls, but the supplied charger tops it up completely in an hour. A useful extra is the voice/call recorder which saves data directly into the phone's memory. When dragged and dropped into the host PC's disk window, the files convert from native SC4 to WAV format and will play on anything, which is very handy.

The inability to listen to MP3s through the standard earpiece and the lack of a fast forward option on the keypad controls were slightly disappointing. Otherwise, it's reasonable value for money if you want an MP3 player and need a new phone too.

***Jeremy Torr***

**Pretec DC-530**

**Pros** Multifunction convenience
Good controls

**Cons** Mediocre music and image quality

**Contact** BlueWay IT
**Phone** (02) 9674 6688
**Online** www.pretec.com
**Price** $531

**Samsung SCH-M105**

**Pros** Good design and neat controls
Top sound quality

**Cons** A bit expensive
No memory expansion

**Contact** Telstra
**Phone** 018 018 018
**Online** www.communic8.com
**Price** $999 (or $499 plus access fees under a 12-month contract)

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*Optional BC-03 high capacity black ink cartridge.*



*PhotoRealism produces colours between colours.*



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*Better Internet images. Image Optimiser, a printer control software feature, can automatically "correct" low-resolution images up to the printer's maximum resolution.*

*Print banners up to 6 A4 pages long, envelopes, overhead transparencies, T-shirt transfers, and even choose an optional fluorescent ink cartridge for display effects.*



## BJC-1000SP
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CS105

# Apple iTunes

If the notoriously tight-fisted Apple is giving away software, then Mac fans need to first download it, and then ask why.




iTunes is a free and easy-to-use digital music manager for anyone running Mac OS 9 or above. iTunes is a leap forward for the average Mac user, who is probably still using the basic CD audio component of their operating system.

However, you should keep in mind that iTunes is intended to be a carrot to lure the unwary into buying the latest G4 desktops, which all have rewritable CD drives (CD-RW). Apple is using iTunes to create a buzz around the new G4s in the same way it used iMovie to lure the masses to the iMac 12 months ago. *APC* was unable to test the CD-burning capabilities of iTunes without the new hardware.

Most people will not be able to use the CD-burning option, but iTunes is still a decent digital music manager. It has a built-in radio library based on the US-centric Kerbango online service. Local stations cannot be added to this list and their URLs must be added manually.

iTunes can download MP3 files into an MP3 player, but only a handful of devices such as Diamond's Rio and Creative's Nomad players are compatible with it. Apple promises that more plug-ins will become available on Apple's Web site in coming months.

iTunes also gives users of older Macs a taste of Apple's new operating system. The interface has the polished look of OS X and will appeal strongly to Mac fashion victims. The transparent organisational structure is also based on OS X and makes iTunes one of the best MP3 managers available, Mac or otherwise.

However, what Apple describes as "simple" also means "lacking in features". For experienced digital music fans, iTunes will be a straightjacket compared to many existing MP3 players. It cannot be customised and does not have equaliser settings to vary bass or treble. Rival Mac MP3 players such as SoundJam and Sound Studio have more features, but are not free. Without dynamic sound control, Apple will have problems pushing its redesigned set of speakers onto iTunes users.

The graphic equaliser is tiny and unresponsive. To compensate, Apple has included "a visual representation of the music" that swirls in a haphazard way along with the music. It is little more than a souped-up screensaver and *APC* looks forward to a decent equaliser in iTunes 2.

*Fiona Angus*

**Pros** Free software from Apple? Go for it.
**Cons** No equaliser and works best with CD-RW

**Contact** Apple
**Phone** 13 36 22
**Online** www.apple.com.au
**Price** Free download

# Intel Play Computer Sound Morpher

It may look like something out of a Buck Rogers serial, but the Intel Sound Morpher won't help you repel alien invasions. Despite the Sound Morpher's high-tech appearance, it is just an average microphone designed for kids.

To be more accurate, the Sound Morpher appears to have been designed to look cool to kids; actual use by kids may not have been planned for. The Sound Morpher connects to the PC through a standard microphone line in, and from there Intel's software takes over. The microphone can be run connected to the PC or separately, but either way it requires three AAA batteries — and as with all kid's toys, batteries are not included.




Sound pickup from the microphone is poor. Despite the futuristic-looking microphone hood, you need to be very close to the unit to be picked up at all. The Sound Morpher is capable of four minutes of recording time, which isn't bad when you break it into soundbites. *APC* was impressed at how extremely fast sound files could be transferred to the PC. The Morpher feels flimsy, especially around the microphone head, and while Intel didn't supply any kids for us to test it on, it seems likely that they'd quickly break it.

The other half of the package is the software, which is designed to look 'cool' — lots of liquid morphing effects between application screens and the like.

The software has simple sound editing functions. The sound editing stage allows effects to be added to sounds. These are labelled as Alien, Rubber Band and so on, and are basically simple sound effects such as echoes, reverberation and increased or decreased pitch. Sounds can be cut up and moved around, but the lack of documentation made this a little mystifying at first. A bunch of stock sounds are also included: explosions, laughter, toilets flushing, basically anything that could be used to create a cartoon. There's also the option to create 'faces'. They try to speak the sound lines as best they can, which is very badly, but they offer some amusement along the way. Files can be saved as simple WAV files, or with facial animations as executables.

*Alex Kidman*

**Pros** Funky styling
Big bright buttons
**Cons** Hardware feels flimsy
Software can be frustrating to use

**Contact** Intel
**Phone** 1300 363 018
**Online** www.intelplay.com
**Price** $129

# 1440 dpi, separate transparent ink tanks with monitoring system. $279.[RRP]

## EXTRAORDINARY QUALITY, superior operating economy, high speed printing plus extra rich blacks, parallel & USB ports for Windows and Mac, optional PhotoRealism and scanner cartridge.

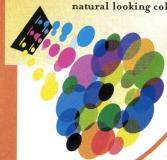
**Advanced imaging performance.**

**Resolution goes up to 1440 x 720 dpi. Drop Modulation Technology™ adds variable ink drop sizes that are automatically used in any of five pattern combinations. Then, the printer control software uses colour definition routines more in line with perceptions of the human eye. The benefits are obvious. Sharply defined lines and text. Vivid, more natural looking colours. Subtlety in shaded and highlighted regions with smooth colour gradations.**

**High speed printing for all colours, blacker blacks.**
Using large print heads and bi-directional printing it prints up to four colour pages per minute. An optional, dedicated black ink tank and cartridge with 160 print nozzles is capable of B&W speeds up to 9 pages per minute.[1] And the black in both the standard and optional cartridge is an extra-rich black ink.

4 ppm colour

9 ppm mono

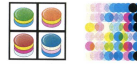




*Automatic Image improvement, broad flexibility, optional scanning. Photo Optimiser adjusts for defects in exposure, highlights and shadows, and prints accordingly. Image Optimiser can print low-resolution Internet images up to the printer's maximum resolution. Print banners up to 6 A4 pages long, envelopes, overhead transparencies and even T-shirt transfers. Turn your printer into a 720 dpi colour scanner with the optional scanner cartridge, pictured right.*



**Colours between the colours with optional PhotoRealism.™**
Low density inks vary the saturation level per dot (e.g. 33% or 67%) for up to five times as many colour combinations as conventional CMYK inks for smoother colour and tonal gradations with vastly reduced grain, even in areas of low colour density.



*PhotoRealism produces colours between colours.*

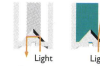
## BJC™-3000
## Just $279[RRP]

*Parallel and USB interface. Both ports are built-in for Windows and Macintosh.[2]*

USB



**Transparent ink tanks, "smart monitoring system," superior operating economy.**
Standard inks are optimised for plain paper. There are individual, transparent ink tanks for all colours, and each is separate from the print head. A beam of light measures ink status through a prism moulded into the bottom of the tanks. This allows a printer driver monitor to report on ink levels, and alert you when an ink is running low. You replace only one colour at a time, and don't have to worry about running out of ink.




*Smart monitoring system.*

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# CD Stomper Click 'N Burn and Veritas MyCD Pro

There was a time, not long ago, when CD-R drives were a pure luxury. Many *APC* staffers remember being impressed by 2x CD-recordable drives, and contemplating if they'd ever be able to afford one. Now, CD-R drives are common. As with all mass market products, it's important that the average consumer understands how to use them. Most CD-R drives come with some form of software, so a standalone CD-burning software package is a tough sell; you have to convince people that you're providing them with something they don't already have.

## CD Stomper Click 'N Burn

Click 'N Burn can be presented in either wizard or full-application mode. If you want to be stepped through the CD-burning process, then use the wizard. One problem with the full-application mode is its busy interface; inexperienced CD creators may get lost in the shuffle. Its expanded interface is standard for CD-burning applications, with lists of burnt files and recording controls. CD Stomper speed settings gave *APC* options for 1x, 2x, 4x and Max settings on a 4x CD-R drive; it's unclear whether you'd get more options with a faster drive. If you're blessed with multiple CD-R drives, Click 'N Burn will record multiple discs simultaneously, but *APC* was unable to test this function. There is an option to scan local drives for speed settings, which is useful if you have multiple hard drives with different RPMs.

CD Stomper also has what it calls 'DJ Burn'. DJ Burn allows for 'live' recording, but this has its limitations. Unless you have an insanely fast system, it's impossible to record direct to CD without some data dropout. What DJ Burn does is record tracks to the hard drive and then burn them to CD. It's like having a sound recorder bundled with the burning software. This is not exactly vital, but it's good for beginners who might not connect the two concepts.

Another extra included with CD Stomper is a CD-labelling system. The applicator is standard; a circular base section to place labels on. CDs can then be stamped down onto the label, producing labels free of bubbles. *APC* easily created acceptable labels. A pack of five labels is included, along with labelling software.




▲ Spot the difference if you can.

### CD Stomper Click 'N Burn

**Pros** Fast recording
Supports multiple drives

**Cons** 'Simple' interface a bit busy

**Contact** BJE Enterprises
**Phone** (02) 8850 1000
**Online** N/A
**Price** $119

### Veritas MyCD Pro

**Pros** Fast recording
Supports multiple drives

**Cons** More expensive than Click 'N Burn for the same software

**Contact** Veritas
**Phone** 1800 222 587
**Online** www.veritas.com/us/products
**Price** $141

## Veritas MyCD Pro

Like Click 'N Burn, Veritas MyCD Pro prides itself on having lots of features. It's actually a set of two programs: MyCD and MyCD Pro, the beginner and full-featured versions of the burning suite. Unlike Click 'N Burn, if you want to access both of them you have to install them separately and there's no facility to switch between them. In its favour, the simple version of MyCD is very easy to follow, with little onscreen clutter.

When *APC* first launched MyCD Pro, we felt that we were on familiar ground. Extremely familiar ground, in fact, because both MyCD Pro and Click 'N Burn are based on Prassi's PrimoCD application. The expert interfaces are identical, the burning times were identical — practically everything was identical, except Click 'N Burn has a few extra features. Also, MyCD Pro crashed twice during *APC*'s test runs, creating two CD coasters.

As the software is identical, comparison comes down to price and extra features, and Click 'N Burn is ahead in both. It offers extra CD options, as well as the label applicator. Even more compelling is the fact that Click 'N Burn is $21 cheaper — no, we can't work out the economics of that one either.

*Alex Kidman*

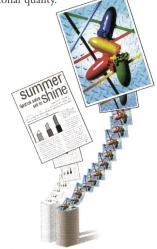
# Big printer performance.

## Small printer price & economy. $159.[RRP]

**HIGH RESOLUTION COLOUR, high-speed blacks and superior operating economy with easy to use, broad flexibility for Windows and Mac. Plus optional PhotoRealism and scanner cartridge.**



**Exceptional results, easily.**
The inks are optimised for plain paper with resolutions up to 720 x 360 dpi that can be automatically enhanced with Drop Modulation Technology.™ Variable drop sizes are placed in any of five "strike pattern" combinations to smooth colour gradations and improve tonal quality.




**Reduced operating costs.**
Super Economy mode uses a special resolution matrix to improve operating economy without the definition sacrifices common to so many draft modes. It effectively quadruples output from both the black and colour cartridges.[1]



**Better Internet images, special effects.**
**Image Optimiser can automatically "correct" low-resolution Internet images up to the printer's maximum resolution. Turn photos into simulated illustrations and create sepia and mono hues, print banners up to 6 A4 pages long, envelopes, overheads and even T-shirt transfers.**






**Duplexing, high speed blacks. A new driver allows manual duplex on plain paper with standard inks. For B&W only, an optional dedicated black ink cartridge with 128 print nozzles offers print speeds up to 5 pages per minute.[2]**



**Built-in parallel and USB interfaces for Windows and Mac.[3]**

**The optional scanner cartridge captures colour photos and text with resolutions up to 360 dpi.**



**Automatic Image Improvement, easily.**
**Advanced colour routines help define half-tones and areas of low colour density. Photo Optimiser automatically adjusts for defects in exposure, highlights and shadows and prints accordingly.**







**Drop Modulation Technology.**
Smaller ink drops, about ½ the size, are automatically mixed with standard drops to enhance quality.



*Layering variable ink densities in each pixel lets you print colours between colours.*

**5 times the photographic colour combinations.**
Optional PhotoRealism™ inks vary the saturation so that a single dot could have 0%, 33%, 67% or 100% of a colour. This produces up to five times as many colour combinations as conventional CMYK inks for better half-tones and less grain.




**Canon Customer Care.**
The one-year warranty is upgradeable to three years for a minimal charge, and is backed by Customer Care hot-line support. For more information call 1800 021 167.

## BJC™-2100SP
## Just $159[RRP]

Canon

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We welcome comments and suggestions. Send correspondence to **APC Readers' Say, PO Box 37, Sydney NSW 1028**, or email **apc@acptech.net**. Letters can also be submitted online at **apcmag.com.** All correspondence becomes the property of *APC* and is subject to editing.

# Do banners ad up?

## Free banner ads

I am a bit confused by [publishing director Glenn Rees's] comments regarding the letter 'Over site' (see *APC* February, page 42). In particular I don't understand his statement that the advertisements on your site "help pay for the free-access site".

It is a shame that the industry is so commercially driven these days that such comments are acceptable to your readers. Once upon a time all sites were assumed to be free. Indeed, the opposite of free was something too horrible to contemplate. One model pay site, the Microsoft Network, failed miserably.

An Internet site is a definite requirement for an IT industry magazine (and should be seen as a business expense). It should be driven by the customer's needs and expectations, rather than being something that is optionally 'free' (and therefore banner-splattered to fund it) as suggested by your comments.

Who pays for the site is not the customers' concern. To suggest that banners are a necessary evil is to suggest that we should have to pay not to have banner advertising. My, how things have changed!

***Rodney Noble***
***Internet***

## Letter of the month




Want to win a Microsoft Office Value Pack? It includes Microsoft Office 2000, the world's most popular desktop productivity suite, and a range of hardware and software for the home and small business: Intel Easy PC Camera, Symantec Norton AntiVirus 2001, GoldMine 5.0 for customer relationship management and a Microsoft IntelliMouse Explorer. It's valued at over $1,700 and retails for only $699. The winner of this great prize will be published in *APC* May. This month's winner is Rodney Noble.

## Not paranoid

I read David Schaverien's 'Virus paranoia' letter (see *APC* February, page 40) with amusement and consternation. What David has failed to understand regarding his indiscriminate downloading and installation of software on corporate equipment are the implications of his actions for network administrators.

Our firewall picks up an average of 20 virus-infected emails each week. Even at home my antivirus software has picked up five virus infected email messages this week. If David has never received a virus, this is most likely due to the vigilance of network administrators.

As for downloading and installing MSN Messenger, he has completely missed the point. Regardless of how "reputable" or "safe" a product is, corporate computer equipment is provided to perform a specific function. That function is not to instant message the family, but to assist in carrying out the duties the person is being paid for. Most corporations' computer usage policies don't permit this type of activity.

Technical support roles are challenging and unrewarding enough at the best of times. They're made all the more difficult when employees (or their families) who think they know best, tamper with the equipment. Many times I've heard people say "I haven't done anything!", only to find an assortment of unlicensed software installed on their computer.

The consequences of indiscriminate downloading and installing of software extend well beyond viruses, but that is the one explanation most people can get their head around, so we use it a lot.

***Shane Brown (network administrator)***
***Internet***

## Recruiters to blame

As I read Peter Thorpe's letter (see APC February, page 40) my overwhelming thought was, 'Thank goodness I'm not the only one!' I too have retrained myself through several years of night courses, and some short-term, full-time study. I started a small part-time computer business about four years ago to give myself some experience, and in all that time, through countless applications I've only had one interview, at which I was told I was overqualified.

I believe that the *real* skills shortage is in the recruitment industry!

Many of these people appear to be little more than sales reps who are too scared of missing out on their commission to put forward anyone who is not a perfect match for the prospective employer's wish list. They seem to offer little more than a data matching service that could easily (and much more cheaply) be done by machine.

The reason most employers want experienced staff is so that they don't lose valuable time training the employee, only to have them leave for a better offer. The way we used to get around such problems in the past was to sign a contract of indenture.

After I left school my first boss knew I didn't know a lot about the technologies I had to deal with, but he also knew I was going to be there for at least four years. Training made sense because there was a guaranteed period of productive work.

In the IT industry, there seems to be a pool of skilled people who are being prevented from demonstrating their skills. I'm sure that most, if not all, would gladly sign a contract of indenture for some agreed period of time to overcome a lack of experience. I know I would.

***Glen Thornley***
***Internet***

**Correction**

'Dogs of 2000'(see *APC* January, page 69) incorrectly states that Optus@Home customers are required to pay extra if they exceed variable usage limits for the service. In fact, if customers exceed a usage limit, Optus may terminate the supply of the service without notice and charge a disconnection fee.

**Conditions of entry**

These conditions apply to all competitions in *APC* March, unless specific conditions are provided with the competition. Instructions on 'How to Enter' form part of the Conditions of Entry of all competitions in *APC* March. Entry is free and open to all residents of Australia other than employees of ACP Publishing Pty Ltd (ACN 053 273 546), suppliers of competition prizes, their families and associated agencies. The contests close last mail February 20. Enter according to the instructions supplied with the individual competitions. The judges' decision is final and no correspondence will be entered into. No responsibility is accepted for late, lost or misdirected entries. All entries become the property of ACP Publishing Pty Limited, the promoter, 54 Park Street, Sydney NSW 1028. The prizes are not transferable or redeemable for cash. Any change in the value of the prizes occurring between the publishing date and the date the prizes are claimed is not the responsibility of the promoter. Winners will be notified and their names will be published on **apcmag.com**.

# Super fast dual print heads, 1440 dpi, 6 ink colours. $399.RRP

## ULTRA HIGH SPEED, superior operating economy, whisper quiet and brilliant quality. Plus optional 6-colour PhotoRealism.

**Advanced print head system.**
The compact body utilises a dual print head system designed to satisfy the needs of even the most demanding user. Speed, plain paper quality, extra rich blacks, individually replaceable transparent ink tanks plus optional 6 colour PhotoRealism and high definition colour scanning. The BJC™-6200 offers it all, in one of the quietest printers ever.




**A smart ink monitoring system alerts users when a colour is running low. There are individual transparent ink tanks for all colours and each is separate from the print heads, significantly reducing operating costs and allowing you to replace only the empty tank.**

*An optional scanner cartridge delivers resolutions up to 720 dpi.*

**1440**
**dpi plus Drop Modulation Technology**

**Superior plain paper print quality.**
Standard inks are optimised for plain paper. Resolutions go up to 1440 x 720 dpi. Drop Modulation Technology™ automatically adds variable ink drop sizes and the printer control software defines colour more in line with perceptions of the human eye.

**BJC-6200**
**Just $399RRP**

USB
*Built-in parallel and USB interfaces for Windows and Mac®.*



**Higher speed, blacker black.**
A high performance engine with bi-directional printing capable of up to 3 lines per pass results in monochrome text speeds up to 10 pages per minute and colour printing up to 7 pages per minute, making the BJC-6200 easily the fastest printer in its class.[1] Plus the black cartridge employs pigment inks for a richer print density with greater water resistance.

**7** ppm colour
**10** ppm mono

**PhotoRealism™ with 6 ink colours for even more tonal gradation.**
Optional low density PhotoRealism inks may be used simultaneously with standard density colour inks. The 6-colour system delivers life-like reproduction, especially on higher paper grades. Tonal gradations are smooth even in difficult to reproduce colours such as skin tones and light, glossy surfaces.



3-YEAR WARRANTY OPTION

*Canon Customer Care.*
*The one-year warranty is upgradeable to three years for a minimal charge, and is backed by Customer Care hot-line support. For more information call 1800 021 167.*

Canon

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CS9808/4

*How far has technology really come?* APC *takes a look at the cutting edge . . . 10 years ago.*

# Way back when . . .

It's hard to believe that in *APC's* March 1991 issue, Microsoft was making waves with PenWindows — software designed to recognise handwriting and accept commands from a pen. This great leap backwards may have been one of the most useless computer applications of all time, but it captured *APC's* imagination enough to make it as the lead news story.

We're sorry to say that *APC* almost completely missed "The New Revolution!" in technology for March 1991. The revolutionary 'Mouse Pen', which supposedly appealed to anyone who had "ever wished for the accuracy of a digitizing tablet", only made it into the magazine in an advertisement for Dick Smith Computers,

A decade ago, Apple was still undaunted by the PC, and the imminent release of the Mac LC was making headlines. At the same time, an enterprising US firm thought it had found a way of getting around Apple's lawyers to sell Mac clones. Ever heard of Nutek Computers?

## First looks/last looks

What really interested *APC* was the latest round of notebooks.

Panasonic made news with its 'inexpensive' $6,000 notebook, and the latest thigh-crushing notebook technology filled a 14-page story. One commentator predicted the death of the desktop. This may seem a little hard to swallow considering that in 1991 a typical suitcase — sorry, notebook — weighed 5kg and boasted a 16MHz processor, 2M of RAM and a 40M hard drive. However, it was the monochrome LCD that *APC* singled out for criticism, devoting a story to the distant hope of TFT passive matrix displays.




Alan Kay, the inventor of the notebook, even made an appearance. He described the initial idea for the notebook as "something more like superpaper". It was the '60s after all.

First Looks reviewed Autodesk's 3D Studio, a 3D modelling graphics package. It may have won the hearts of reviewers, but consumers looked askance at the $5,000 price tag. A new operating system called GeoWorks also received a recommendation, accompanied by a diatribe against Windows's undeserved monopoly.

Despite this, Microsoft won the approval of reviewers by adding a toolbar to the new release of Microsoft Excel 3.0. The more things change . . .

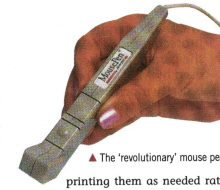
## Hang on to your rolodex

*APC* went all out to explore the features of Microsoft's newly released operating system. "Since the release of Windows 3.0, everything has changed. For the first time, users of DOS-based computers have a graphical user interface flexible and powerful enough to support applications of every kind." Despite the smorgasbord of new gizmos, including "lovely" new 'screen blankers', *APC* advised readers to hang on to their rolodexes (a mechanical device for storing names and addresses).

Another new technology to receive only qualified support was the numeric coprocessor. *APC* considered the technology significant enough to warrant 12 pages of turgid text with no less than 16 performance comparison tables, but advised readers against actually *buying* one. Readers who purchased the magazine to discover the answer to the question illustrated so credibly on the front cover may have been a little disappointed. So, was the magic of numeric coprocessors fact of fantasy? Well, the magic was real enough. It was just a pity that the technology wasn't applicable to the PC.

## What were we thinking?

Weighing on the minds of *APC's* columnists was a new regulation forcing businesses to display their company seal and number on all legal correspondence. Stan Beer took a brave stand, declaring this would be the catalyst for businesses to start storing their letterheads on disk and printing them as needed rather than buying traditional preprinted stationery. Jeremy Horey, who unlike Beer still writes for *APC*, was wrestling with the concept of multimedia and the uncertain future of mixing text and graphics.




▲ The 'revolutionary' mouse pen

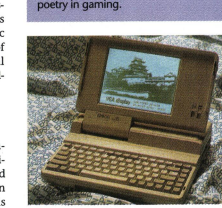
However, readers were more interested in Word for Windows 1.1, and one wrote in to lambast its subscripting flaws.

Jeremy Torr (who is still with *APC*) was impressed with strategy role-playing game The Bard's Tale. He thought the "quaintly amusing" dialogue and "fearsome monsters" were sure to "delight and occupy many gamesters for hours". The written dialogue delivered by heavily pixelated characters such as Gwendolyn and Rune-flinger was liberally sprinkled with dramatic adverbs. However, this was nothing compared to the accompanying verse.

Come here the tale of Skara Brae —
A god returned from to have his way.
Creatures of the darkness, spawn of night,
The Mad One's kin destroyed the site.

***Fiona Angus***

**Next month:** Torr enthuses over the latest developments in computer voice acting, but laments the decline of good poetry in gaming.

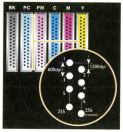


▲ The latest thigh-crushing notebook technology (in 1991).

# Microfine droplets, 1200 x 1200dpi. Just $699.[RRP]

**ONE MILLION four hundred and forty thousand drops per square inch, 6 ink colours, 4 pico-litre sized drops and 33 tonal levels. Photo printing with zero-graininess image quality beyond the limits of human eye-sight.**

**Smaller, better ink droplets. A unique Canon process called MicroFine Droplet Technology™ produces 4 pico-litre ink drops. Using a special star shaped nozzle each droplet is created to be centre-weighted and near perfectly round for more accurate placement.**




*Nozzle layout diagram.*

**Extra large print heads with 6 transparent ink tanks.** There are 256 print nozzles per colour for a total of 1,536 on the print head. This helps resolve the conflict between speed and quality. Separately replaceable, transparent ink tanks and a smart monitoring system help maximise operating economy.



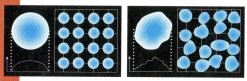


*Star shaped nozzle.*



*An optional scanner cartridge delivers resolutions up to 600 dpi.*

*High precision dot control.*



*BJC-8200.* *Lower-level technologies.*



**1200 x 1200 dpi, super low density ink.**
Precision placement allows 1,440,000 dots per square inch using inks approximately ¼ the density of normal inks. This gives an apparent dot size corresponding to 0.67pl of ™ regular ink, enabling photo printing equivalent to approximately 1800 dpi.

*Parallel and USB interface. Both ports are built-in for Windows and Mac.*[1]

**SuperPhoto mode, 33 tonal levels.**
In SuperPhoto mode the BJC™-8200 can print up to 42 ink droplets per pixel (dot). This allows the printer to achieve 33 tonal levels with zero graininess, even in highlights or gradations where dots are normally distinguishable.



*SuperPhoto mode with 33 tonal levels.*

## BJC-8200
## Just $699[RRP]

*Canon Customer Care. The one-year warranty is upgradeable to three years for a minimal charge, and is backed by Customer Care hot-line support. For more information call 1800 021 167.*

3 YEAR WARRANTY OPTION

Canon

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CS9808/5



**Jeremy Horey**

Jeremy Horey is a senior consultant with Com Tech. He can be contacted at jhorey@ozemail.com.au.

*The views expressed in this column do not necessarily reflect the views of Com Tech.*

*Both sides are pacing the ring, but don't expect a knockout in the .NET vs Java bout.*

# .NET vs Java

The computer industry is a great spectator sport. You can sit on the sidelines and watch the players slug it out in the market. For a while, two brands of Unix stood toe to toe, sparring over which was more open and more standard. Then we had the great NT vs Unix fight. Hot on the heels of this one came the browser wars.

Now a new battle is under way: .NET vs Java. On one side is Microsoft, going it alone. On the other side are Sun and IBM, along with a crowd of relative newcomers such as BEA and ATG.

Both Sun and IBM have gone a few rounds with Microsoft in the past. They've taken some punishment and landed some good punches too. Microsoft is bolstered by its hold on the PC, unfazed by the strength of the opposition.

So let's take a look at the two sides. During the next year, more than 60% of programmers worldwide will use the Java programming language in their work. Whether they write whole systems using Java or simply call Java components, the language is now mainstream.

Increasingly, large organisations are turning to Java application servers, such as IBM's WebSphere and BEA's WebLogic, to develop new applications. They use them to work with the data collected by other systems such as SAP or Oracle Financials.

Some predict that, within two years, most large-scale corporate applications will use these platforms for all their business logic. Technologies like J2EE and JavaBeans are having a big impact on how companies build and integrate software. The technology is available now and is well proven, but it is still not completely mature.

Java has not done so well with end users. Apart from some specialist calculators, very few Web sites now run Java. The lack of bandwidth has limited what Web developers can do with Java on the client side.

Meanwhile, Microsoft is pushing its new .NET architecture, which supersedes COM, COM+ and Microsoft Transaction Server as the company's framework for building applications. However, .NET is still only a promise. The first parts of the new framework won't be available until the end of this year, and the full framework won't be proven until around 2003. To use .NET, developers have to learn many new techniques and technologies.

.NET has one technological advantage over Java. Applications and their data sources don't have to be closely linked to work well together. This means .NET is more suitable for Internet-enabled applications that interact remotely. All Java implementations are still based on a closely coupled architecture.

> Most organisations are going to find themselves coping with both .NET and Java.

.NET makes Microsoft a serious contender for large-scale projects. It provides a three-tier structure like that provided by Java application servers. However, it is closely tied to Windows and doesn't have Java's cross-platform capacity and scalability.

There are some hidden limits to Java's cross-platform capacity. Java is the most transportable language ever, but much of the functionality of a major application comes from the application server. If you build an ecommerce site in one application server, you need to use the prebuilt modules such as shopping baskets and payment pipelines. You then become tied more closely to a single application server. It's possible to move an application from one brand of Java application server to another, but you must modify the application to do so. Building everything from the ground up makes it easy to move from one Java server to another, but few organisations have the time or money to do this.

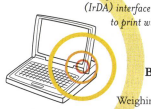
As with previous conflicts, there will be no simple resolution. Most organisations are going to find themselves coping with both .NET and Java.

# Portable, cordless, small and smaller. From $399.RRP

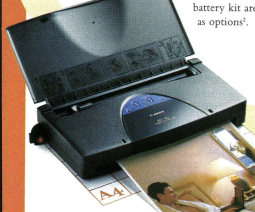
## WONDERFUL IDEAS FROM CANON for people needing a portable printer. Choices in size, weight and performance enhancement.

**BJC™-85. Super powerful portable printer, international adaptor standard.**
It fits easily into a briefcase, but offers desktop quality and flexibility. An international power adaptor is standard and a sheet feeder is built-in. IrDA 1.1 plus parallel and USB interfaces for printing from Windows, Windows CE and Mac are standard. Gold standard photographic printing via PhotoRealism™ and a long-life NiMH battery kit are available as options[2].

*Totally cordless operation. Battery packs[2] and built-in infrared (IrDA) interface work with suitably equipped notebooks or PC's to print without needing interface or power cables.*



**BJC™-50. Ultra small, ultra light, built-in Li-ion battery.**
Weighing only 900 grams, the BJC-50 is approximately ½ the size and weight of the BJC-85. Using the included battery and IrDA interface it is capable of cordless communications out of the box, and offers a host of performance enhancements similar to the BJC-85.[2]







**BJC-50**
**Just $649RRP**

**BJC-85**
**Just $399RRP**

**Exceptional colour reproduction, automatically.**
Using standard inks optimised for plain paper, both printers automatically print high quality images using special functions included in the printer control software. Drop Modulation Technology™ uses variable ink drop sizes to smooth colour and tonal gradations.

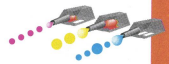
**High quality colour, high speed black and white.**
A four colour print head with resolution up to 720 x 360 dpi comes as standard. Both printers accept an optional dedicated black ink cartridge with 128 print nozzles for print speeds up to 5 ppm.[3]



Photo Optimiser adjusts for defects in exposure, highlights and shadows and prints accordingly.

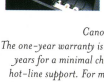


Image Optimiser can "correct" low-resolution Internet images up to the printer's maximum resolution. You can print banners up to 6 A4 pages long, envelopes and overhead transparencies.



*Variable ink-drop sizes.*

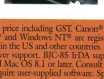
*Optional colour scanner cartridge for images, fax and OCR.[4]*



*High speed black.*



*Four-colour print head.*





*Canon Customer Care.*
*The one-year warranty is upgradeable to three years for a minimal charge, and is backed by Customer Care hot-line support. For more information call 1800 021 167.*

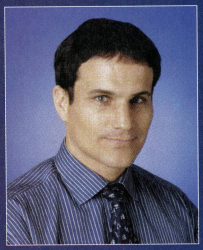
1-YEAR WARRANTY OPTION

Canon

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*The government and the courts need to understand technology to protect our security online.*

# Playing safe



**Leif Gamertsfelder**

Leif Gamertsfelder is a member of Deacon's digital industries group and specialises in Internet-related legal issues. He can be contacted at leif.gamertsfelder@deaconslaw.com.au.

*This article is intended to provide a general summary only and should not be regarded as a substitute for legal advice.*

Why don't software companies develop secure products? Because it is not their duty to do so. The primary duty of a software company (as for any other company) is to increase the value of the company for its shareholders. Security features cost money to develop and implement, and they generally have a negative impact on performance. Increased production costs lead to lower margins. Lower margins mean less profit and a less valuable company. The economic incentive is clear: don't build a secure product unless consumers demand it or the law requires it.

This situation is analogous to that faced by the automobile industry early last century. As soon as the first cars rolled out of Detroit in 1909, there was a need for seatbelts. However, it wasn't until the middle of the century that laws were passed making seatbelts mandatory in new cars.

Studies in the US show that in the 1990s seatbelts prevented over 55,600 deaths and 1,300,000 injuries and saved more than $US105 billion in costs. The savings to industry and society are enormous. Like software security, seatbelts involve an element of inconvenience. Inconvenience has never been a strong selling point. Ever met someone that enjoys wearing a seatbelt? Probably not. Most motorists wear seatbelts because the law requires them to.

> Laws only promote Internet security if courts interpret them well.

You won't meet too many people that get excited over security features either. That doesn't mean they aren't essential. They could save industry and society billions of dollars each year — money lost due to the unauthorised use of computers.

It has been estimated that Microsoft sites are the target of up to 10,000 cyber attacks per day. Most top companies (while being less popular targets than Microsoft) also report an increasing number of attacks. These attacks are made easier by the many insecure programs that populate the Internet. Clearly, governments need to act to protect consumers and critical infrastructure — that's what governments are for.

In the US, draft laws mandate comprehensive new electronic security requirements for organisations in the health and banking sectors. These laws aim to provide a much higher level of protection for computers on the information superhighway.

Similar laws are also needed to ensure the security of people's computers generally. The poor security of many computers allows hackers to use them to carry out attacks on corporate targets and national infrastructure.

Laws such as these are a good development, but they must be drafted appropriately. The Australian government recently introduced the Digital Agenda Act, which will make security testing much more difficult (if not impossible) under certain circumstances. This is like wearing a seatbelt that can't be tested. These types of laws reflect the poor advice politicians receive about technology issues.

Also, laws only promote Internet security if courts interpret them well. If judges don't understand technology, this is difficult. Recently, the US introduced a technology education program for US federal judges. This will assist judges in making appropriate decisions in technology cases.

Justice Michael Kirby of the High Court of Australia has raised this issue in Australia. Some Australian judges have argued that education programs are unnecessary as judges are already specialists, capable of learning 'on the run'. However, this view fails to acknowledge the extreme complexity of many technological issues. Litigants in technology cases invariably prefer to appear before a judge who can deal confidently with technology.

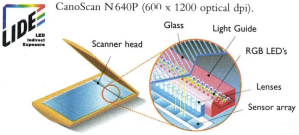
If we are to provide secure cyber streetscapes, these issues need to be addressed as soon as possible.

# It's not *just* a scanner, it's a Canon for only $119.[RRP]

## SLEEK, SIMPLE TO USE scanners with patented LIDE Technology, pass-through parallel connection and full software suite.

### Introducing LIDE.™

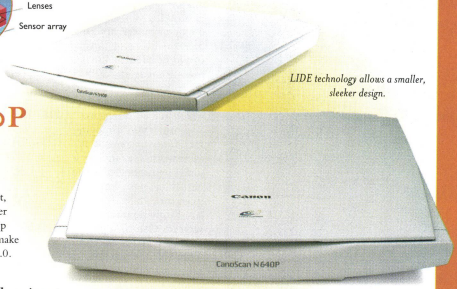
LIDE (LED Indirect Exposure) fundamentally changes the way scanners work, and their price/performance ratio. LIDE eliminates the need for costly, complex optical mirrors, while it maintains image quality and colour clarity in two super slim, sleek scanners. The CanoScan N 340P (300 x 600 optical dpi) and CanoScan N 640P (600 x 1200 optical dpi).







**Easy to use.**
**The ScanGear Toolbox (pictured above) lets you select functions and the final destination of your scan such as printer, e-mail program, fax, copy or others,[1] and automatically makes settings for you.**




*LIDE technology allows a smaller, sleeker design.*

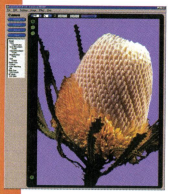
300 x 600 dpi

## CanoScan N 340P

**Just $119[RRP]**

**Getting started is remarkably easy.**
Your scanner plugs directly into the parallel port, or hooks up as the middle link between a printer and your PC. Quick-and-easy CanoScan™ Setup installs the included software, and you're ready to make your first scan with Windows 95/98/2000/NT 4.0.

**Full software suite, 42-bit colour input.**
The CanoCraft CS-P software works for both stand-alone image acquisition, and as a TWAIN driver for other applications. Advanced controls for colour matching and image definition allows various pre-scan settings such as selecting the scan area and adjusting resolution up to 9600 dpi[2] with up to 42-bit colour input. The software package also includes ArcSoft PhotoStudio 2000 for photo-editing and Caere OmniPage Pro for converting scanned documents into editable text data, plus a CD ROM with user's manual.



*CanoCraft makes high quality colour easy.*

**42 bit input**

600 x 1200 dpi

## CanoScan N 640P

**Just $149[RRP]**

*Canon Customer Care. The one-year warranty is upgradeable to three years for a minimal charge, and is backed by Customer Care hot-line support. For more information call 1800 021 167.*

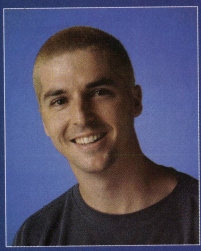
3-YEAR WARRANTY OPTION

Canon

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*Ever feel like you're trapped in that Monty Python café where everything on the menu comes with spam?*

# Spam, spam, spam, spam



**Derek O'Neil**

Derek O'Neil is the managing director of Internet solutions business Indigo Interactive. He can be contacted at derek@indigointeractive.com.au.

*Indigo operates the email service freemail.com.au and is a shareholder in permission marketing company 5fx, which holds the Australian representation rights for PostMasterDirect.com.*

Spam. It would have to be one of the major failings of the Internet. Unfortunately, the underlying mechanism for email — the SMTP protocol — isn't designed to prevent any of the common abuses of email, including spam. Email evolved from a simple messaging system intended for a few people on distant computers into a huge network of 500 million people sending billions of emails around the world every day. The original designers never imagined that it would achieve this size, let alone that email would be used by hawkers to sell obesity prevention drugs, US IRS returns, pyramid marketing schemes and banana plantations somewhere in the Caribbean.

Spam is very annoying for email users, but it's even worse for email system operators. Take the email system freemail .com.au, where spam is constantly damaging service provision. It is not uncommon for freemail .com.au to receive as many as 500,000 spam emails per hour, causing regular email traffic to be impeded.

> Ultimately, spam is the responsibility of email users. If no-one responds to spam, then spammers will cease.

The police don't have the resources to deal with the prolific volume of spam, so how is the world going to stop it? Ultimately, spam is the responsibility of email users. If no-one responds to spam, then spamming will cease. At least, that's the theory.

There are some golden rules email users would do well to follow. First, never respond to spammers, even if they're selling something you want to buy. If you do want to buy that banana plantation in the Caribbean, find another way to purchase it. Responding to spam tells spammers that someone is reading email at that address and is foolish enough to respond. Logical conclusion: send more spam to that email address.

Second, report spam. Not to the police, but to organisations like SpamCop.net or mail-abuse.org. These sites are valiantly attempting to encourage self-regulation for ISPs to prevent spammers. They also provide a great way to anonymously report spam and let the ISP (who may be unaware) know that the spamming activity is originating on their network.

Spam is annoying and unwanted. However, email can still be used effectively for marketing. Advertisers can send emails to people who want to receive them. Yes, that's right, some people actually want to receive information about products that are of interest to them. Even more amazingly, people respond to emails they find interesting and relevant.

This is a simple concept called permission marketing; you invite someone to let you know that they want to receive your product information (your Web site is a great place to put your invitation). When they ask for information, send it to them. Figures from permission marketing specialists such as PostMasterDirect.com show that well-run permission marketing lists have a drop-out rate of less than 1%, and response rates of 5% to 30%.

Provide an opt-out process that works and is easily understood, and remember, when someone on your list asks you to stop sending them information, you must stop. Otherwise you become a spammer.

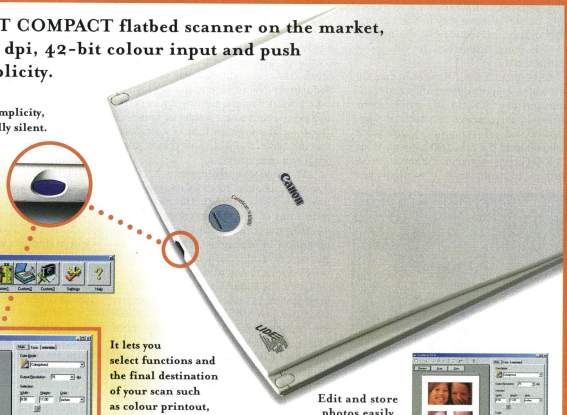
If you don't have your own list of permission users, you can rent one. Companies such as 24/7 Media, yesmail .com and PostMasterDirect.com have databases containing millions of people who have subscribed to permission marketing lists for thousands of product and topic categories.

Who knows, you may even manage to offload that banana plantation in the Caribbean.

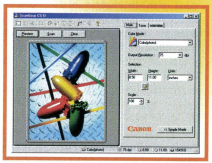
# Plug and play USB, push button simplicity 600 x 1200 dpi, just $189.[RRP]

## THE MOST COMPACT flatbed scanner on the market, 600 x 1200 dpi, 42-bit colour input and push button simplicity.

**Push button simplicity, unconventionally silent. A one touch scan button activates ScanGear Toolbox CS (the scanner control software).**





**It lets you select functions and the final destination of your scan such as colour printout, e-mail program, fax, copy or others,[3] and makes the necessary settings for you.**



**Edit and store photos easily.**
ArcSoft PhotoStudio 2000 is an easy to use image editor, and ArcSoft PhotoBase creates photo databases. Adobe Acrobat Reader and PDF manuals for Windows and Mac are included.

**High powered scanning with LIDE.**
Patented LIDE™ technology delivers optical resolution up to 600 x 1200 dpi with 42-bit colour input. ScanGear CS offers direct scanner control and is a universal TWAIN driver for other applications.
It lets you make pre-scan settings such as selecting the scan area and adjusting resolution up to 9600 dpi.[2]



## CanoScan™ N 650U
### Just $189[RRP]

**Plug 'n play USB for Windows and Mac.**
The USB interface is compatible with Windows 98/2000 and Mac OS 8.5 or higher[1]. It lets you plug in or disconnect your scanner without having to turn off your computer first. And, because the scanner is powered directly through the USB cable, it does not need a separate AC cable.



**42 bit input**

**"Z-lid", advanced OCR.**
This special lid simplifies book scanning and OCR with the bundled Caere OmniPage Pro[4] converting scanned text into editable data.

*Canon Customer Care. The one-year warranty is upgradeable to three years for a minimal charge, and is backed by Customer Care hot-line support. For more information call 1800 021 167.*

3-YEAR WARRANTY OPTION

Canon

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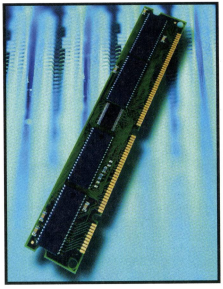
*The road to a successful memory upgrade can be full of potholes.*

# Memories...

Buying extra memory for your PC can be the cheapest way to boost performance, but beware — the price of RAM is more fickle than for any other component.

RAM prices have always been volatile, and right now the forces of supply and demand are pulling the price down. However, keep an eye out, because some retailers are still charging the high prices left over from the pre-2000 memory crisis.

RAM prices soared after a key semiconductor manufacturing facility was



destroyed in the September 1999 Taiwan earthquake. At the same time, many hapless Microsoft users were forced to boost their RAM to meet the demands of Microsoft's new operating system. The combination of a shortage of product and an escalation in demand saw consumers pay about 30% to 50% above current market prices. One salesperson told *APC* that RAM is like the world gold market; to buy and sell profitably, timing is everything.

Over the coming months, prices are likely to fall as newer models become available and retailers try to off-load old stock. However, the process is erratic. Seductively low advertised prices may not reflect what you end up paying, depending on the make and model of your PC. Some popular manufacturers recommend specific types of RAM, and this restricts what you can safely buy.

*APC* asked several different retailers to upgrade an older model Compaq desktop with 128M SDRAM, the most common form of RAM. A memory upgrade on this machine would improve the operation of Windows 2000, as well as increase overall speed and allow more applications to run at the same time.

There are different speeds of RAM, but your system requirements will determine what you can buy. The faster 133 or 168-pin models are generally slightly more expensive than the 100-pin model required by *APC*'s Compaq. The only real choice you have is how much extra memory you want. Even there, once a certain performance level is reached, extra RAM is superfluous, so it is only worth buying what your system can use.

Adelong Computers had the best price for 64M SDRAM — $79. The same upgrade cost $187 at Performance Memory & Peripherals. For a 128M upgrade, expect only a slight cost saving per megabyte. International Software Warehouse charged an extraordinary $332.20 for 128M, while Rite Price Computers came up with the best price of $153.

Rather than make a guess over the phone, Adelong asked to see the machine to make sure the RAM would work. The company also advised us to contact Compaq to find out what type of RAM it recommended. Adelong staff were the most helpful and knowledgeable, but they also had the highest installation charges; about double the other retailers.

Test the RAM before handing over your cash. International Software Warehouse provides no installation service and does not accept exchanges or refunds for incompatible RAM. If you buy over the phone or online, be very sure you know the correct type of RAM.

Harris Technology's prices were steep, but it was able to match the RAM designed most specifically for the model *APC* described. Harris was the only retailer to specify the manufacturer of the RAM, and described the California-based memory manufacturer Kingston Technology as "a good brand". In comparison, Performance Memory & Peripherals had a hard time matching RAM to the model and took over 30 minutes to track down pricing information.

If the lure of faster computing entices you to try a memory upgrade, be prepared to negotiate some highly variable prices.

## About Price Watch

Each month, Price Watch examines variations in retail pricing and service. Investigations are conducted anonymously, either by telephone contact with retailers or through pricing details supplied on their Web sites. Prices and specifications provided here are as quoted by retailers; while we assume these are correct, we cannot accept responsibility for errors or omissions.

| Retailer | Contact details | SDRAM | Price | Installation fee |
|---|---|---|---|---|
| Adelong Computers | www.adelong.com.au | 64M | $79 | |
| | | 128M | $155 | $49.50 |
| Harris Technology | 1300 135 555 | 64M | $129 | |
| | www.ht.com.au | 128M | $242 | $28 |
| International Software Warehouse | 1300 300 003 | 64M | $155.20 | |
| | www.iswh.com.au | 128M | $332.20 | No installation |
| Performance Memory & Peripherals | (02) 9906 4533 | 64M | $187 | |
| | www.performancememory.com.au | 128M | $231 | $20 |
| Rite Price Computers | (03) 5672 4887 | 64M | $80 | |
| | www.ompac.net.au | 128M | $153 | $25 |

# *Super high* resolution in a *super sexy* scanner, just $299.[RRP]

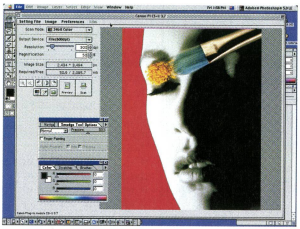
## SCANNER BREAKTHROUGH. 1200 x 2400 dpi, 42-bit colour input and LIDE technology in an ultra compact case.

42 bit input

**Semi-professional scanning with LIDE.**
Canon's patented LIDE™ was a flatbed scanning breakthrough that changed the price/performance ratio while maintaining image quality and colour clarity. The CanoScan™ N 1220U, with 1200 x 2400 optical dpi and 42-bit colour input, demonstrates the evolution of this technology, delivering "semi professional" quality in a super slim, super sexy looking case.



LIDE LED Indirect Exposure





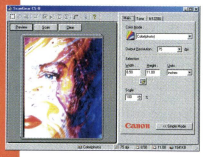
**Simple, professional quality software.**
The one-touch scan button activates ScanGear Toolbox CS to select functions and the destination of your scan such as colour print out, e-mail program, fax, copy or others,[1] and makes the necessary settings for you. ScanGear CS offers direct control for pre-scan settings such as selecting the scan area and adjusting resolution up to 9600dpi.[2] It is also a universal TWAIN driver for applications such as the bundled Adobe Photoshop LE, a limited edition of the world's most popular image editor.




## CanoScan N 1220U
### Just $299[RRP]



**"Z-lid", advanced OCR.**
This special lid simplifies book scanning for OCR with bundled Caere OmniPage Pro[3] to convert scanned text into editable data.



**Edit and store photos easily.**
ArcSoft PhotoBase creates electronic photo albums. Arc Soft PhotoStudio allows easy image editing.

**Plug 'n play USB for Windows and Mac.**
The USB interface lets you plug in or disconnect your scanner at any time without having to turn off your computer first.[4] And, because it is powered through the USB cable, the scanner does not require an AC cable.

USB

1-YEAR WARRANTY OPTION

*Canon Customer Care.*
*The one-year warranty is upgradeable to three years for a minimal charge, and is backed by Customer Care hot-line support. For more information call 1800 021 167.*

Canon

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C98029

*Like something out of* Star Trek, *US police may soon be packing phasers as well as pistols.*

# Set phasers to stun

An effective, nonviolent method of restraining people has long been the dream of armed forces around the world. In the US, the Department of Defense has been spending money on developing weapons that can incapacitate a person without causing injury. Each year, it holds a contest where the best inventions and patents are put up for its approval. Those that make the grade get further R&D dollars and the possibility of a contract.

Past devices have included guns that propel sticky webs of glue at great force, effectively pinning a person's arms and weapons to their body or against a wall if they are in front of one. This weapon has been successfully tested and comes with a solvent to disentangle the victim from the sticky mess. However, the gun can only be shot a few times and heavy cylinders containing the glue and propellant must be carried along with it.

Other avenues of research have included low-frequency sound waves that cause nausea and disorientation, isotropic radiators that can damage the human eye or electronic optical systems, as well as sleeping gases and other forms of sedatives.

US police have already used pepper sprays, stun guns and tasers to incapacitate people. Pepper spray causes a great deal of pain and can injure the eyes. A spray in the face causes intense pain, temporary blindness and usually makes the victim fall to the floor. The effects are temporary.

Tasers and stun guns are very alike, but they work in different ways. Both work by giving the victim an electric shock, which causes them to lose control of all voluntary muscles and become disoriented for a few minutes. The stun gun is a handheld weapon that requires the officer to get close enough to the victim to touch the gun against the skin or clothing before discharging.

The taser provides an easier approach. A taser is aimed like a gun from afar and shoots two darts at the victim. These darts are connected to the unit by coiled wires and once the victim is hit the electric charge pulses out, incapacitating them. Some taser charges can penetrate up to 5cm of clothing. Tasers are accurate from 7m to 10m, but most models are one-shot units that take some time to repack.

## The wireless weapon

HSV Technologies of California has designed a new tool that combines the effect of a taser with the functions of a *Star Trek* phaser. The as-yet-unnamed weapon — referred to at the moment as the nonlethal tetanising beam weapon — is capable of stunning a person without the need for projectiles, wires or physical contact.



The unit fires two beams at the victim. These cause their muscles to contract and freeze involuntarily, effectively stopping them short. The unit hasn't been tested on people yet, but in theory there are no lasting injuries and the effects wear off after a short time. The prototype is theoretically capable of hitting a person up to 2km away, but it's how the tetanising beam weapon works that is most interesting.

The unit fires two beams of ultraviolet radiation at the victim. This creates two 'wires' in the air by ionising the oxygen particles along the beam's path. These ionised plasma beams are capable of carrying an electrical charge and are far more conductive than normal air. The charge is then shot out from the unit — one channel conducting electricity to the victim, the other away from them.

The frequency of the electrical charge is set to the electrical frequency the human body uses to contract muscle. As long as the beam is aimed at the victim, the tetanising frequency stimulates the muscles and keeps them locked in place. In normal muscle use, the tetanising stimulation from neural and electrical impulses relaxes, so the muscle relaxes. While the beam is focused on the person, there is no muscle relaxation.

The thought of all your muscles freezing is a frightening one. However, it's thought that the tetanising frequency only works on skeletal muscles, not the heart or diaphragm. This is because skeletal muscles are striated and are susceptible to much weaker electrical impulses than those used to make the heart or diaphragm work. Apparently, the effects of the beam are not painful either, because they are much the same as normal muscle contractions.

One fear with this type of weapon is eye damage. HSV Technologies hasn't performed tests with the weapon yet, but the company believes that the levels of ultraviolet radiation are low enough to be filtered out by the cornea. However, it admits that inflammation and discomfort could result from the beams being shone into someone's eyes for a period of minutes.

The prototype currently under construction is roughly the size of a small suitcase, but in years to come there should be handheld versions.

***Darren Ellis***

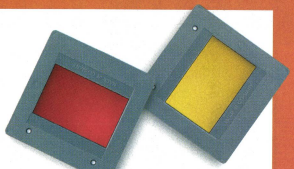
# Combined print *and* film scanner with USB, *surprisingly low* $299.[RRP]

## BUILT-IN FILM SCANNING up to 1200 x 1200 dpi plus high quality photo scanning in an easy to use scanner.

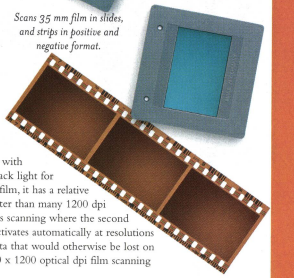


**Easy to use print and film scanner with USB.**
The CanoScan™ D 660U solves diverse scanning needs simply. No adapters or add-on kits. Everything is built-in, and is available with the push of a button, one for photos, and one for 35 mm positive or negative film in either slide or roll format. For beginner controls, ScanGear Toolbox lets you select functions and the final destination of your scan such as printer, e-mail program, fax, copy or others.[1] Or, direct driver control lets you adjust scan size, resolution, and other parameters. The USB interface connects to either Windows 98/2000 or Mac OS systems.[2]

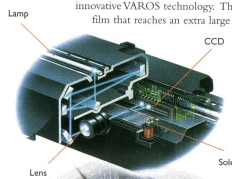


*Scans 35 mm film in slides, and strips in positive and negative format.*



**Superior 35 mm film scanning with VAROS.™**
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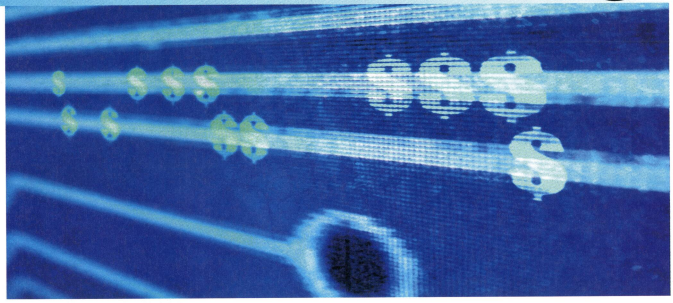
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# Fraud of the pings



*New technologies designed to combat Internet fraud may help give online shopping a much-needed boost.* ***Angus Kidman*** *dives in with the Net shark catchers.*

After several years of careful education, consumers are finally beginning to realise that shopping on the Net is generally just as safe as shopping through conventional retail channels. However, this doesn't mean the battle to create secure online trading systems is over.

As etailers attract more customers, they face an increased risk of fraudulent transactions. These can range from simple, one-off problems such as stolen credit cards, to more complex and systematic attacks involving bogus orders using fake credit card numbers, or systems that try to bypass payment mechanisms when ordering goods. Sometimes these problems can be the result of human error — at one point early in its career, the Web site of music chain Sanity allowed orders to be placed without payment — but increasingly, they are also the result of deliberate attempts to defraud.

Perhaps the most widely publicised problems occur when data on individual consumers is accessed in bulk by hackers. Australia's first well-known cyber-crime occurred in 1995, when hacker 'Optik Surfer' accessed credit card details stored by ISP AUSNet. Optus suffered a similar attack last year. US electronics retailer Egghead also had its credit card database accessed by an unauthorised source last year. Credit card numbers obtained in these attacks can be used for fraudulent transactions. However, the hacks appear to have been committed for technological glory rather than as a deliberate attempt to steal credit card information.

Local data on the issue is scarce, but overseas surveys suggest that the problem is increasing for etailers. A Gartner Group study of 160 companies conducted in July last year found that online retailers were 12 times more likely to experience fraudulent transactions than conventional retailers. Gartner found that these transactions are more costly to Internet retailers, who are usually liable for the cost of dud deals and are generally charged higher fees for credit card transactions than physical retailers.

However, having created the problem, technology is also helping to provide the solution. Just as consumer security concerns were largely overcome through the use of improved encryption technologies, fraud concerns for retailers can be addressed with fraud-reduction systems. Anti-fraud technologies are becoming a standard part of online selling, helping to eliminate fraud before it becomes systemic.

Implementation of anti-fraud systems could make a dramatic difference to the cost of selling online. A study released in January 2001 by financial research firm Meridien Research highlights the possibilities. Meridien estimates that Internet payment fraud will grow from $US1.6 billion worldwide in 2000 to $US15.5 billion by 2005. That figure could be cut to just $US5.7 billion with the use of anti-fraud technologies. A $US5.7 billion loss is by no means small, but it's not much compared with the $US45 billion spent online in 2000, let alone the $US310 billion Meridien is forecasting will be spent with credit cards by 2005.

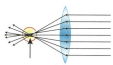
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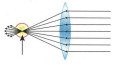


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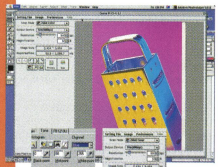


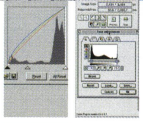

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"Card fraud on the Web is declining because these solutions work well, and also because merchants have gotten smarter," Meridien analyst Jeanne Capachin said. "With wider adoption, we could eventually see online fraud rates consistent with those of telephone-initiated transactions." Speeding that process is an increasing level of merchant concern. Capachin estimated that only 30% of retailers are using full anti-fraud systems, but 61% of merchants surveyed by CyberSource in mid-2000 indicated their intention of improving their anti-fraud measures in some way.

Despite a widespread perception that the US leads the world in implementing most ecommerce-related systems, other data collected by CyberSource suggests that Europe may be taking the lead. In a similar survey conducted in the UK, almost half the respondents said they were using an automated fraud prevention solution and many of the others perform manual checks.

## How does it work?

Along with standard checks such as verifying credit card numbers, anti-fraud software looks for atypical behaviour in the buying patterns of consumers. For instance, if a customer who routinely has items of a certain kind sent to a particular address suddenly changes that address, this is noted. Other address discrepancies such as different billing and shipping addresses are also noted, but experts warn that this is not always a reliable indicator. What if your credit card statements go to a post office box, but your deliveries to a street address? Other rule-based detection options include flagging transactions when an unusually high volume of an item is ordered.

A more sophisticated variation on the same approach creates statistical models of buying behaviour which can then be matched against incoming transactions. New businesses need to rely on data from other companies, but businesses that have been established longer can apply the analysis to their existing transaction data. Many software packages also work in real time, adjusting their models with data accessed from live customer sites and protecting those sites at the same time.

Many etailing sites already use rudimentary techniques such as email confirmation. For instance, if you ask to change the primary email address associated with an account, you may be asked to enter an access code that is sent to your previous mail account. This prevents third parties making changes to account details without your knowledge, but it causes problems if you lose access to the previous account (for example, if you change jobs).

Some sites also use the anti-fraud mechanisms that are built into the credit card system. For instance, as well as asking for card numbers, sites can ask for the security codes that are printed on the back of many credit cards (usually a three-digit code following the normal 16-digit number). These are not generally printed on transaction slips, and make it harder for the credit card number to be used casually in a fraudulent transaction. However, it's less convenient for the shopper, and if shoppers elect to store credit card details for future use, the protective mechanism is eliminated. Some credit card companies have taken a more radical approach. For instance, American Express offers 'one time' credit card numbers for online use. These are cancelled after a single transaction.

## What else can be done?

Of course, anti-fraud technologies alone will never solve all etailing woes. Many online stores complained that sales over Christmas 2000 were flat because the media has been protraying Internet retail as declining. With such pessimistic views in circulation, many consumers assumed that ordering online would be a waste of time.

A study by anti-fraud technology developer CyberSource has already found that putting in place anti-fraud mechanisms can actually scare off consumers, especially if they're already uncertain about the level of security available online. "Even though Internet fraud can significantly impact online revenues for a business selling online, it was interesting to learn that the respondents' greatest concern about implementing a fraud screen solution was jeopardising customer goodwill," CyberSource marketing vice-president William Donahoo said.

These fears might be exaggerated. "Consumers continue to flock to the Net without regard for the pain faced by online retailers," Forrester Research analyst Christopher Kelley said. He claimed that "98% of Web buyers say they will continue to shop online and 65% won't alter their spending at all."

One issue still unresolved is what to do when fraudulent transactions are uncovered, especially if the transaction originated overseas. Etailers can usually cancel fraudulent deals, but tracing and prosecuting the miscreants can prove more difficult.

Many observers believe that Internet crime is hard to police and impossible to punish, and fraud is no exception. "The safeguards are few at this early stage of trying to track crime on the Internet, and many crimes will go unpunished during the next three years," Gartner vice-president Richard Hunter said. "Today's Internet criminals don't have to rob banks — using technology, they can just as easily rob tens of thousands of individuals, with less chance of being caught."

In a few cases, the fraud originates with online businesses. A common complaint among users of adult sites is that after they sign up, additional unauthorised charges appear on their statements (see *APC* August 1999, page 52). The instigators assume that people will be too embarrassed to complain to their bank about unauthorised charges from porn peddlers.

Etailers are continuing to launch educational initiatives aimed at cutting fraud and combatting the perception that it is rampant online. The Worldwide E-Commerce Fraud Protection Network is a trade association founded by American Express that includes a number of high-profile etailers, such as Amazon.com, buy.com and Expedia.com. The group runs a Web site, merchantfraudsquad.com, designed to provide a clearing house for anti-fraud resources and information. "Combating online fraud represents a huge challenge, as merchants can be vulnerable to a wide range of criminal tactics, even if their own Web sites are secure," co-chairperson Jennifer Bennet said. "The Network seeks to identify these vulnerabilities and provide smart solutions for fighting back." apc

## Staying safe

The Worldwide E-Commerce Fraud Protection Network recommends the following for the bare minimum of security for all online retailers.

- Ensure that all credit card information held by a site is encrypted and/or password protected.
- Make sure data transmission is secure and limited to authorised users.
- Keep all security software up to date and ensure firewalls are properly configured.
- Contact law enforcement agencies in any situation where crime is suspected.

The Network also recommends the following specific strategies to help combat credit card fraud.

- Obtain real-time authorisation from a credit card company.
- Employ address verification systems.
- Use credit card verification codes.
- Use rule-based detection.
- Purchase predictive statistical models.

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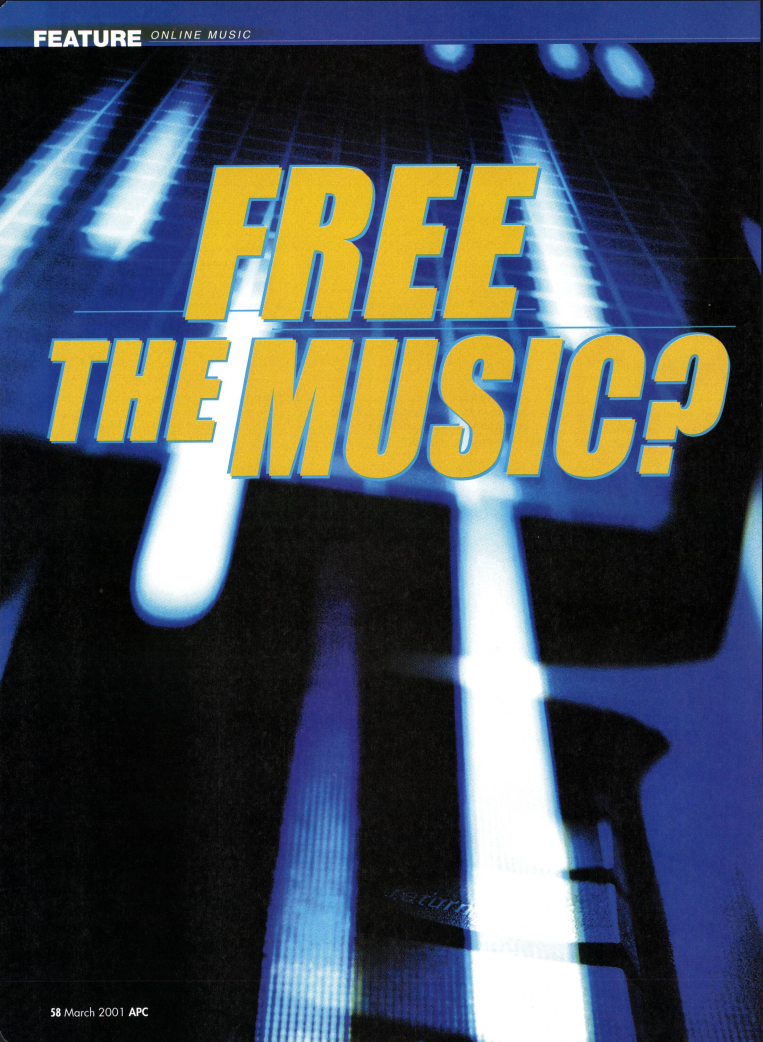
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# FREE THE MUSIC?

*Is there life after Napster for online music?* ***Daniel Gardiner*** *looks back at the issues and technologies that have shaped the past 18 months, and examines possibilities for the future of digital music.*

Around the year 1991, an amazing thing happened. A global network of computers, previously used only by scientists and government employees, began to stir a small amount of public interest. Over the next five years, as more and more people began to own home computers, many more people discovered this phenomenon, and by 1996 the terms Internet and World Wide Web were firmly embedded in the common language of most Western countries.

By this time, businesses had started to catch on to the possibilities that the new medium offered, and although few knew how to successfully get themselves into this digital realm, they started flocking online in droves.

In the intervening years, the Web has grown significantly, from a place with little to no graphical or aural content into a bustling hive of activity for both. Many forms of traditional media such as TV, newspapers and magazines, have modified their style and content significantly in reaction to the Net.

However, certain businesses were slow to adopt the new technology. Copyright owners were rightfully wary of a computer's power to digitise their intellectual property, and naturally scared by the prospect of mass online piracy, countless cases of which were showing up in courts around the globe.

Piracy was already a part of the Web, but it was generally confined to small enclaves, difficult for the average user to find and harder still for them to decipher if they ever did.

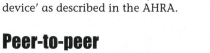
## The little format that could

Three years ago, almost nobody had heard of the MP3 format. MP3 is a form of software compression that allows music from compact discs to be copied to a computer as small, manageable files while still maintaining high-quality audio. Developed in Germany by the government-sponsored Fraunhofer Institute during the late 1980s, MP3 lay in wait for almost a decade until the Net arrived and demonstrated its true potential.

For the record companies, MP3 represented their ultimate digital nightmare. In 1998 they had attempted to stop the release of the Diamond Multimedia Rio MP3 player, a portable walkman-style device that allowed people to copy MP3s from their computer and then go mobile with them. The RIAA (Recording Industry Association of America) officially filed the suit on the grounds that the Rio did not comply with the Audio Home Recording Act (AHRA), which strictly prohibits the use of digital audio recording devices that allow serial copying. Their case was defeated in June of 1999 based on a technicality; the Rio required a PC to do the actual recording and processing of MP3s and was therefore not strictly a 'recording device' as described in the AHRA.

## Peer-to-peer

In mid-1999, a small startup company called Napster, the brainchild of 19-year-old college student Shawn Fanning, released a program designed to facilitate Internet chat and to trade MP3s with fellow chatters. The program (also called Napster, based on Fanning's nickname) works by allowing anyone on the Internet




to log onto a central server and then search the computers of other connected users for MP3 files. Once a desired music file is found, the program initiates a peer-to-peer file transfer, copying the MP3 from one person's computer to the other.

The program quickly drew a loyal following, but it also gained the attention of major musicians, as well as the RIAA and the five major record labels it represented.

## The lead up

By this stage, MP3 had made a reasonable amount of headway into becoming a mainstream phenomenon. However, the RIAA had been winning other victories. For example, it put pressure on Internet search company Lycos to strictly confine its MP3 search engine and remove all sites with illegal MP3s from their directory. There was no general source for music files. Internet users looking for MP3s were having to visit hard-to-find niche sites, and for a moment it almost seemed that MP3 might sink back into the same territory as 'warez', relying on relatively small communities of dedicated users for its survival.

Napster changed everything. It rapidly gathered users, and a self-perpetuating cycle ensured that it attracted more and more people. The more individuals who joined, the wider the variety of music available on the network, which encouraged even more people to sign up. Music was being traded freely, but no-one (except perhaps Napster itself) was making any money from it. The Napster network very effectively demonstrated to the major music labels the power of the Internet for information dissemination.

In the eyes of the RIAA and some artists, Napster was openly flaunting copyright and intellectual property law. It was seen as a direct threat to the ability of companies to sell CDs. Another factor, which was also very important to the music labels, was that Napster posed a threat to other online music sales models. If users could log onto the service and download any music track they wanted for free (albeit illegally), what chance would the industry have of selling its own legal, licensed copies?

## The lawsuit

On December 7, 1999, the RIAA filed a lawsuit against Napster, claiming that it infringed US copyright and state laws. The case was held in the US District Court under Judge Marilyn Hall Patel.

In the months prior to the filing of the case, Napster had not been without its share of media coverage. Then, with the small startup fighting a court battle against one of the most powerful business groups in the world, it went from being a local celebrity to an international star. Membership grew even more rapidly.

The RIAA's argument was quite straightforward: the majority of Napster users were illegally trading copyrighted works owned by its members — the five major labels — EMI Recorded Music, BMG Entertainment, Sony Music, Warner Music Group and Universal Music Group. Napster was therefore facilitating the illegal redistribution of patented intellectual property.



Napster countered with several arguments based on prior cases, and the key to its early defence was the Sony Betamax case of 1983. At that time, Universal City Studios had filed a suit against Sony, claiming that the device allowed home users to illegally tape television programs. The court ruled in favour of Sony, saying that while this was one possible use of the technology, it was the responsibility of the consumer to not illegally tape programs.

Napster also felt it was protected by the Digital Millennium Copyright Act (DMCA), which holds that Internet service providers are not accountable for their users' storage of illegal files on their system.

The RIAA's first move was to attempt to have a preliminary injunction passed against Napster that would force it to stop all illegal trades. As this was effectively impossible given the nature of the technology and its inability to determine what is in a file, it would have forced Napster to shut the network down. Judge Patel passed the measure, but her ruling was rebuffed on appeal in what has been called a midnight stay of Napster's execution.

## Artist versus artist

Around this time, artists began to get involved in the fray. In early April 2000, Metallica (a band that had a definitive role in modern heavy metal) filed a lawsuit of its own against Napster. It claimed, in much the same way as the RIAA, that Napster's service allowed the band's copyright to be violated. Many of Metallica's fans were horrified by this move, and some went as far as to call for boycotts of the band's products and albums. Notorious rapper Dr Dre (real name Andrew Young) soon followed the metal band, filing another suit calling for the removal of his music from the online community.

These were the first big mainstream artists to come out against Napster. Others quickly came to its defence. Public Enemy rapper Chuck D was one of its most outspoken supporters, publicly slamming the major labels and the current industry. An essay on the Public Enemy Web site proclaimed: "I'm in support of the sharing of music files. I believe that truly another parallel music industry will be created alongside the one that presently exists, and that's the bottom line stake that traditionalists fear." He argued that Napster was not a threat to music. It was simply an evolution of music technology, like the radio or cassette tape, both of which the music industry rallied against when they were first released.

Metallica argued against the service on the grounds that they no longer had the ability to decide what happens to their own work. Lars Ulrich, the band's drummer (and most vocal member on the subject) explained in an interview with US broadcaster PBS: "In essence, it's about control. It's really about controlling what you own. We clearly own our own songs — our master recordings to them — and we want to be the ones who control the use of them on the Internet."

Courtney Love, frontwoman for the band Hole, let rip a scathing attack against the music industry in May last year, with a well-publicised speech that was reprinted on Salon.com. She came out in favour of the new technology, praising it as a method for artists to escape a stifling music industry dominated by five major corporations. She argued that in the development of the music industry, "Somewhere along the way, record companies figured out that it's a lot more profitable to control the distribution system than it is to nurture artists." However, she also seemed wary of the threat of technology companies ignoring artists in the same way she claimed major labels do. "Why aren't these [technology] companies working with us to create some peace?" she asked.

## Facing facts or selling out?

In the meantime, Napster was still fighting in the appeals court against the RIAA, trying to reach a final decision on whether the

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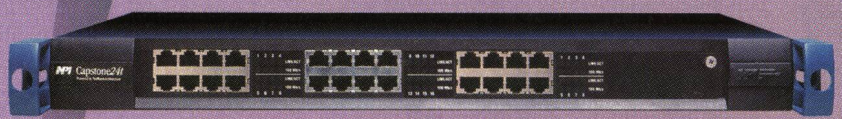


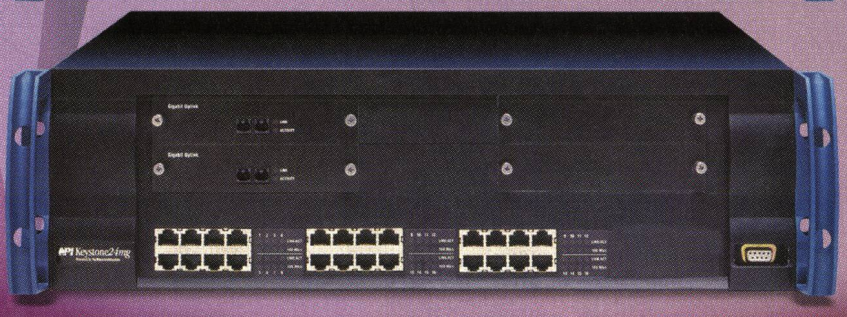
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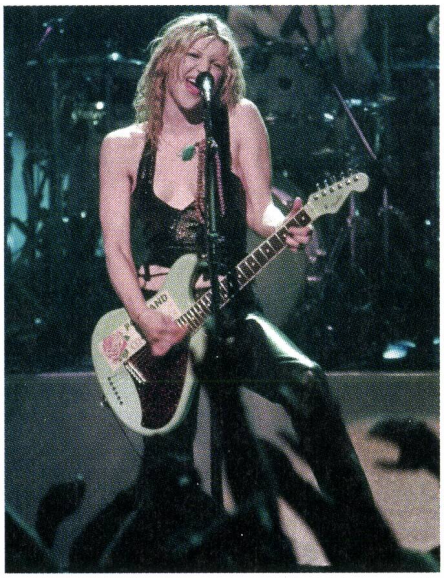
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▲ Courtney Love called on technology companies to help nurture the artists they relied upon.

service should be shut down pending the real trial. The judges hearing the case were unable to make an immediate decision on October 2, 2000, the last official day of hearings. At the time of writing, we are still waiting, but preliminary indications might point to a victory for the recording industry.

On October 25, 2000, a deal was announced between Bertelsmann (the parent company of BMG) and Napster, in which the former would lend $US50 million to help develop a new membership-based model for Napster. However, the BMG lawsuit would not be dropped until this new system was implemented.

Napster advocates everywhere were shocked. In court, Napster had used arguments implying that the record labels were evil monopolies; now it was teaming up with one of them.

## SDMI: saviour or gaoler?

The RIAA had not been idle in its own approach to online music. Towards the end of 1998, as the popularity of MP3 grew, the RIAA got together with the International Federation of Phonographic Industries and the Federation of Music Producers Japan to create a strategy that would allow them to sell digital music securely over the Net. Called the Secure Digital Music Initiative (SDMI), the organisation was joined by almost all of the major technology manufacturers, including Sony Corporation, Philips, Mitsubishi, Pioneer and Samsung. There are now over 140 companies in membership.

The companies trying to create SDMI have had to walk a very fine line. The group has drawn flak ever since its inception, both from North American consumer groups advocating free speech and fair use, and from technology experts who insist that what the organisation seeks to do is impossible with current technology.

The basic idea behind the initiative is to discover a way to embed watermarking into future audio CDs so that they can be identified and verified by compliant music players. The watermarks should be robust enough to withstand compression or encryption into other digital formats such as MP3. The original model was to have two watermarks in each song. One of these watermarks would be designed to break if transmitted over the Internet. The players would know that tracks with two watermarks were OK to play, but not those with only one. The players would also play files with no watermarks at all, allowing people to digitise their current music collections.

Many technology experts suggest that SDMI is the perfect example of the large media companies' failure to come to terms with the digital age. Instead of embracing the advantages of new technology, they attempt to impose old, physical, economic rules on it. To facilitate this, the digital system must be restricted and curtailed in unnatural ways.



▲ Dr Dre has also sued Napster, calling for the removal of his music from the online community.

A challenge issued to the hacking community by SDMI in September of last year caused a sensation. The organisation provided examples of the five technologies it would use to protect music files (four watermarks and one undisclosed method of protection). Hackers were challenged to remove the technologies without seriously degrading the audio quality. There was a cash prize of $US10,000 per technology broken. The Electronic Frontiers Foundation, a group dedicated to consumer rights advocacy, immediately called for a boycott of the event, saying that any hacker who participated was doing corporate dirty work.

Not everyone agreed; in fact, some SDMI insiders wanted the technologies to be broken specifically to point out the inherent weakness of the whole concept. That way, they could start from scratch and build a system based on different principles.

A coalition of researchers from Princeton University, Rice University and Xerox



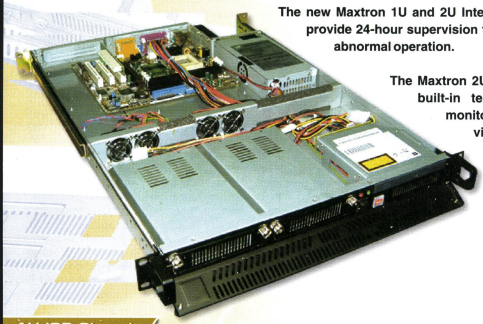
▲ Metallica has horrified many fans by suing Napster for breach of the band's copyright.

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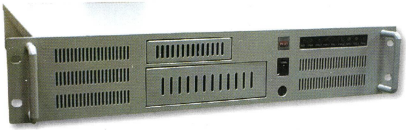


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soon claimed to have defeated all four watermarking technologies. The automated system, which checked their entries and then replied with an email to verify that it had been broken, seemed to agree with them. However, there were two stages in the testing, and the researchers chose not to advance to stage two. Stage two included other tests to check the quality of the audio files, but it required the researchers to sign a confidentiality agreement, meaning they could not discuss their work. Their entry was therefore not counted and the SDMI announced in November that only two of the watermarking technologies had been broken, and only one of these attacks was repeatable.

## Food for thought

January 2001 has seen some very significant events in both the SDMI camp and in the realm of those who oppose it. Recently, the Future of Music Coalition (www.futureofmusic.org), a group of individuals from different areas of the music scene, held a large conference at Georgetown University in Washington to discuss the future. The summit was chaired by Utah Republican Senator Orrin Hatch, who is also a musician. He said that he looked forward to increased use of the Internet as a distribution and promotional tool. "This can be a great boon to music fans, to musicians and to the people who serve them both, but only if the last group — the intermediaries — remember that their reason to be is to serve the people they mediate between, namely, the artists and the audience," he stated in his opening address. Attendees were from many different parts of the music industry, including musicians, programmers, CEOs and technology experts. According to an Inside.com report, the overall feeling at the conference was supportive of new open source, unsecured distribution technologies, despite the ramifications for copyright.

On January 24, the SDMI's executive director Leonardo Chiariglione announced he was stepping down from his position, due to commitments to other projects. Chiariglione often chastised the companies that formed the SDMI because disagreements and infighting between them held up development of the standards and products.

DMAT

DIGITAL MUSIC ACCESS TECHNOLOGY

▲ The DMAT logo will appear on all music devices which are SDMI compliant.

At a general SDMI meeting two days later, the industry partners decided to push ahead with the implementation of the standard, aiming to have products on the market for Christmas 2001. They have also chosen to go with one of the watermarking technologies that was reportedly cracked by the team from Princeton, Rice and Xerox. This will be used in conjunction with the fifth non-watermark technology that was part of the contest and which wasn't cracked. Participants at the event seemed to have been happy with the overall decision to go for pragmatism, rather than 100% foolproof security.

> Will consumers ever buy these products if they can have unrestricted ones for the same price?

Solid-state media devices, like the MP3 portable devices currently available, are certainly here to stay. They will definitely become increasingly mainstream as Internet media build up steam.

However, new storage products from IBM and Intel seem to point to an adoption of the SDMI system. Restrictions have been built into the hardware that govern what a user can and cannot do with their digital media. Will consumers ever buy these products if they can have unrestricted ones for the same price? More importantly, are they legal? The consumer watchdog Electronic Frontiers Foundation (www.eff.org) has often spoken out against technologies that confine what people can do on the grounds that they violate US free speech and fair use laws. Microsoft and InterTrust, among others, have developed software with similar aims to SDMI, to protect intellectual properties in digital format. Digital rights management, as it is known, is now widely available to distributors willing to pay for protection of their media.

Recently, several independent record labels have joined the Napster/Bertelsmann alliance, with both Edel and TVT signing up to help develop the membership-based service. The new Napster network must have a lot to offer if independents are willing to join up so soon.

The Napster business model is a double-edged sword for large companies. The ability to deliver thousands of music files to subscribed users requires large amounts of bandwidth and equipment, which in turn costs money and eats into your profits. However, under the Napster peer-to-peer model, your customers provide each other with bandwidth. Of course, securing the system is another matter. If secure music files are designed to break when transmitted over the Internet, then having people swapping files back and forth could be problematic. Special transfer methods would have to be written, ones that would be difficult for hackers to steal and use to set up free systems.

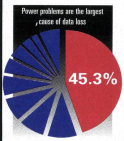
In a recent interview with Sam King, co-founder and vice-president of MP3.com.au, he stated that the Internet would act to help level the playing field, and that even though the large corporations would still maintain a large percentage of control, there would be a lot more room for independent labels and individual musicians. "The Internet is an empowering medium above all else," he said.

The key question still comes down to one of two outcomes. Are we headed for an open source system, with a revised view of online intellectual property rights and an expanded public domain? Or will SDMI succeed in its attempts to offer consumers a system of secure music downloads that discourage Napster-like free trading networks through digital rights management? Either decision has huge ramifications for the nature of the Internet and digital business in general.

Despite the Napster/Bertelsmann deal, the appeal court's decision is still very important to an overall outcome, as it could be used as a precedent in future lawsuits to support one model or the other. This is why the judges are taking their time in reaching a conclusion. The future of online music is still far from secure.

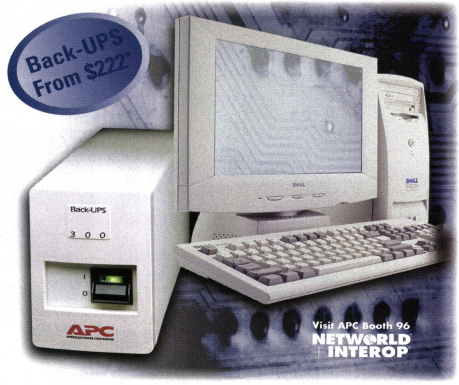
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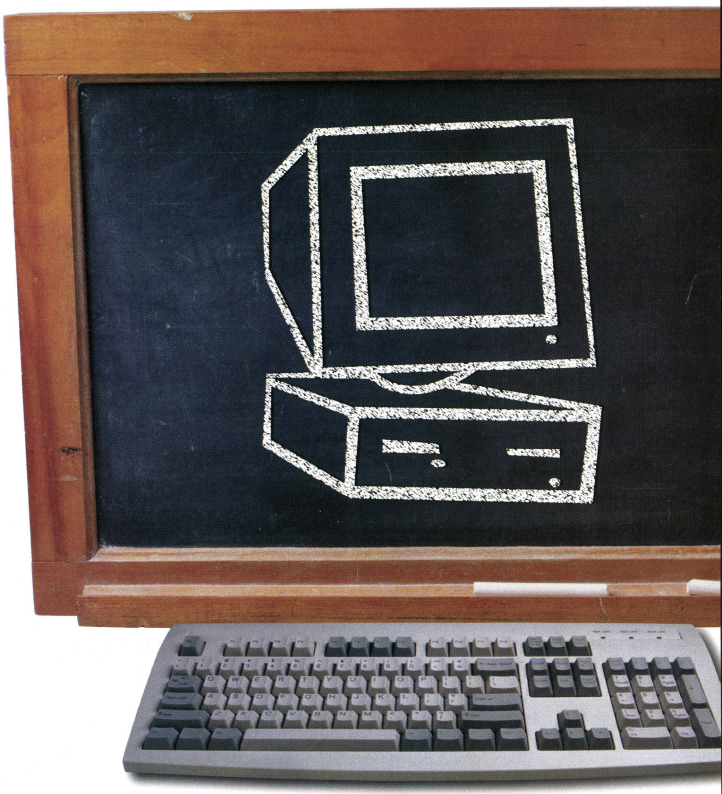
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# The digital classroom

*More than 20 years after computers were first introduced into Australian schools, technology is yet to take hold in the classroom.* ***Fiona Angus*** *investigates.*

At Junee High School in western NSW, none of the classrooms have computers. Pam Roberts, a maths and computing teacher at the school, describes it as "a typical country high school".

"We are required to use computers in every course, but there are limitations on access," she said. Students have access to one lab with 15 computers and another with 20. Each staffroom has a PC and there are 10 terminals in the library.

However, the labs are reserved for students enrolled in computer studies. Other students and classes must be slotted in around these classes.

As a computing teacher, Roberts has to provide network support and maintenance for the labs on top of her normal teaching load. "The reality is that network support in state schools is self-taught. The ideal would be a trained IT person who is not expected to teach." According to Roberts, some teachers have not responded well to the pressure to use computers in teaching. "I'm stunned at the number of young teachers who lack computer skills," she said.

According to the Australian Bureau of Statistics (ABS), teachers have roughly the same level of basic computing skills as their students, and students are ahead of teachers in more advanced computer skills. The ABS also found that half of all school students only have rudimentary computer skills that go no further than switching on a computer and operating a basic application.

Despite the billions spent on providing computers to government schools, most students are forced to rely on their home computers.

However, take a trip to a school not under government management and chances are the average classroom will look very different. Students at Holy Cross primary school in Cairns have access to 50 roaming iBooks, and the entire school operates on an AirPort wireless network. The school also provides an iBook for every teacher and 40 iMacs are distributed between the classrooms and a central lab.

The Catholic Education Office of the Diocese of Cairns provides advice and support for each of the 25 schools in the diocese. Each family is charged a computer levy of up to $20 to pay for computer maintenance and consumables such as printer cartridges. Holy Cross has committed to upgrading the computers every few years under a leasing agreement with Apple, so future students will not be disadvantaged by outdated technology after one hefty capital outlay.

Information technology officer Kathleen Aulich, provides specialist IT support for the diocese. She said that schools favour the laptop and wireless option because it is flexible and suits different classroom and teaching settings. Aulich is planning to roll out wireless networks in another five schools. "The schools see it as the future," she said.

Unlike Junee High School, Holy Cross funds and controls how it uses computers itself. "Our philosophy is that you need to put the technology in teachers' hands," Aulich said. "At first the reaction was mixed; some teachers were hesitant and some were eager, but two years down the track everyone has really embraced it."

The diocese has big plans to improve Internet access for remote schools in the Torres Strait. "We are looking at becoming own Internet service provider," she said. "One of our problems is reliability in the remote areas — some schools have to pay long distance charges that eat away their budget."

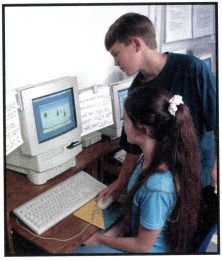
The ABS has warned that students in government schools across Australia are behind students in non-government schools when it comes to computers.

For children whose families cannot afford to invest in technology, the classroom is the only place where they can acquire computer skills.

## The ratio game

According to federal education minister David Kemp, Australia will be left behind in the information economy if future workers are not computer literate.

Industry is starting to ask why Australian students are not learning IT skills in school. Technology is getting cheaper and more accessible, but the school situation remains largely unchanged. "A lot of people think that computers in schools is a new thing," said Brett Clarke, president of the Educational Computing Association of Western Australia (ECAWA), a professional association of teachers devoted to improving the use of computers in schools. "Every few years there is a reawakening, but computers have been in schools since



the 1970s and governments have been sinking money into hardware ever since."

According to Clarke, the meaningful use of computers in schools has been held back by the same bureaucratic mistakes made since the advent of the microcomputer. "Each new set of educational administrators comes in with limited experience and uses the same strategy — it's always been about ratios."

In the ratio game, funds are channelled directly into hardware, while support and teacher training are carried within already strained school budgets. "Politicians like ratios — they are an easily measurable thing and they believe the public can understand them," Clarke said. However, teachers often do not have the skills to manage computers in a classroom setting.

"There is a difference between what is said and what is done. The picture that is

# And the winner is...

Despite the move to a national IT framework for all government schools, education is administered at a state level and the level of access to technology varies widely across the country.

## Australian Capital Territory

The government spent $20 million on hardware and Internet access between 1997 and 2000 and every full-time teacher was given a new PC. A large number of school PCs are donated ex-public service computers. In 1999, schools were given 1,000 discarded machines. ACT schools have the best computer-to-student ratio — less than 1:5.

## New South Wales

About 90,000 computers were provided to schools between 1997 and 1999. This resulted in a computer-to-student ratio of 1:11. From 2000 to 2003, the government has pledged to upgrade these machines and provide a further 25,000 computers to reduce the ratio to 1:5. The government claims most schools now have a ratio of about 1:8. All government schools were connected to the education department's wide area network in 1996. Teacher training is being conducted through the Technology in Learning and Teaching (TILT) program. By June 1999, 15,527 teachers had completed the training and another 10,000 teachers are booked into the program over the next four years. A further 15,000 teachers and school staff will be trained as support technicians.

## Northern Territory

The government will spend $13.5 million over the next two years on hardware, teacher training and infrastructure to improve Internet access.

## Queensland

The government has committed $131 million over three years to hardware and teacher training. It has established a wide area network to connect all schools, and a further $6.5 million has been set aside for extra teacher training.

## South Australia

The government claims it will have a ratio of 1:5 by the end of the year after spending $85.6 million on hardware over the last five years. All schools are also due to have a broadband Internet connection by the end of the year. The government has committed funds to research teaching methodologies using new technology, and teacher training programs are under way.

## Tasmania

The government spent $13.5 million on computers for 23 schools between 1998 and 2000. Secondhand computers from the federal and state public service are also passed onto schools. Tasmanian teachers are required to attend a four-part training course, and a handful of teacher/technicians will be trained to provide support to staff within schools. Most schools still only have a 64Kbps ISDN link or are using a dialup Internet connection.

## Victoria

Widely considered the leader in the IT educations stakes, the former Kennett government handed out 40,000 laptops to teachers. Victoria devoted more than $100 million to hardware and training between 1998 and 2000. Over the next year, the new Bracks Government has allocated $10 million for hardware grants and has a ratio target of 1:5. About 600 schools are yet to reach that target. The government recently scrapped a Kennett-inspired computer funding scheme where schools received $1 of government funding for every $3 raised by the school.

## Western Australia

Schools will receive $90.96 million in cash grants over the fours years to 2002. The state is aiming for a ratio of 1:5 for high schools and 1:10 for primary students. The government has spent $9 million over the last three years connecting schools, but some are still not linked to the Internet.

## Independent schools

In the Catholic school system and other independent schools, all administration and funding of IT is controlled by each school.

painted is usually different to the reality of the classroom. When it comes to digital literacy, the way computers are being used varies and the impact on student education varies." According to Clarke, independent schools are often able to manage their computers more effectively because they have more financial and administrative flexibility.

If computers are to be of any use in the classroom, teachers must know how to use them and how to teach using them. "Hardware has a life span of three to four years, but a teacher has a professional lifespan of 10 to 20 years. I would argue that spending money on a well-trained teacher is better than buying a piece of hardware," Clarke said.

"But computer literacy among teachers is largely unseen, and as with many innovations, it is hard to measure. While the general public are fed ratios, governments get away with it. People have to start asking what is the difference between ratios and quality learning outcomes."

## Teaching teacher

The school staffroom has proved one of the most difficult institutions for technology to infiltrate. When they enter the classroom, teachers are more likely to reach for chalk than a keyboard.

A NSW Government review of teacher training in September last year cited technology as one of the biggest issues facing the education sector. The subsequent report, *Quality Matters*, noted that "over the past 100 years, when compared to most other professions, teaching has been the least adaptive".

The report said some teachers fear that technology in the classroom will devalue their professional skills and turn them into "functionaries who operate machines". The report slammed so-called 'post-office' online education projects, which deliver educational material over the Internet but involve little interaction between teacher and student.

According to Clarke, a teacher should actively structure learning activities, explain difficult concepts and help students with different learning styles. The report supports this view, stating that, "Technology cannot simply be bolted onto existing structures and ways of doing things. When that approach is taken, it is almost inevitable that computers will sit in classrooms unused."

The report also said that one of the best hopes for the profession is the crop of young teachers who are likely to take computers for granted. However, Ilana Snyder, Associate Professor in the Faculty of Education at Monash University warns, "The majority of teachers are over 40, and while a lot of teachers have acquired skills, some haven't. The government is recognising that change will only happen if teachers are trained."

This year, many teachers employed in state schools will undergo special training, and others will be forced to undergo skill tests. In Queensland, the government has provided extra funding for training after the previous training provisions were found to be inadequate.

"The pressure to technologise is one of the biggest issues confronting teachers," Snyder said. "Teachers are expected to do a lot for little extra money and still function and work well." Author of the book *Teachers and Technoliteracy*, Snyder believes there are big differences between government schools, poorer Catholic schools and the well-funded independent schools.

Many teachers in well-managed programs have welcomed the changes. Last year, teachers employed in Catholic schools within the Archdiocese of Sydney were put on the fast track to computer literacy by a special program designed within the district.

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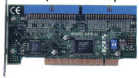
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# And what about teachers?

***A classroom teacher of 25 years' experience explores the major IT issues affecting educators.***

Over the past four years, the NSW Government has placed 90,000 computers in its public schools and connected those schools to the Internet. Since the first announcement, the Department of Education and Training has slowly developed policy and training programs to support this massive infusion of technology. For many teachers interested in computers and their potential, it has provided exciting opportunities in the classroom. However, the process has left others frustrated and struggling.

The government provided computers with return-to-base warranties and Microsoft software, but not the related hardware or much of the necessary subject-specific software. Some financial assistance has been provided recently, but most schools have borne the very considerable cost of subject-specific software (including expensive site licences), printers, ink and laser cartridges, cabling and the maintenance associated with these. Schools have also incurred significant costs trying to make rooms secure. However, despite their best efforts, nearly 1,000 computers were stolen or vandalised last year alone. In some less advantaged areas of the state, access to computers is restricted, either because of the absence of appropriate software or because of the school's inability to provide the necessary security.

None of the 90,000 computers placed in schools are for the use of teachers in staffrooms. It's common to find staffrooms with no computers in them, or ones that have a single computer shared by as many as eight or 10 teachers. A significant number of those with computers, do not have Internet access. The problem of inadequate access is further exacerbated by the fact that many teachers still don't have computers at home. Consequently, many of those who have been trained have only limited access to computers, and limited opportunity to practise their skills. This makes it difficult for them to prepare lessons for use in the computer labs or direct students towards computer-based research in the library or at home.

Those who have participated in the department's basic Technology in Learning and Teaching course generally speak highly of it. However, four years into the program, less than half the state's teachers have been trained. It will be another three years before the training program is complete. Professional development programs aimed at providing more than just basic computer skills are only now being offered to teachers. Despite this, there is a clear expectation that all teachers integrate computers and the Internet into their teaching.



Most schools have established computer labs, generally with 15 to 18 computers in one room. The high demands computing studies classes place on computer facilities mean that teachers of English, history, art, music, economics and other subjects get only limited time in the labs. Their classes have to be slotted in around the computing studies classes, making continuity a problem.

Even when they do have access, teachers face other problems in the labs. Will all the computers be working? Will the printer run out of ink at a critical stage? Will access to the Internet be so slow that sites will 'time out' before they appear on the screen? Will a reasonable site a student wishes to visit be intercepted by the department's Net censorship program because it contains a reference to human anatomy or sex? Will one of the students be able to fix an unforeseen problem or will the computer coordinator (who happens to be teaching a class on the other side of the school) be needed?

In most schools technical support is provided by enthusiastic, self-taught amateurs who juggle their classroom teaching with lending assistance when possible. Many are relieved of part of their teaching load, but the compensation is usually more than offset by the time consumed in carrying out minor maintenance, dealing with suppliers, purchasing consumables, coordinating access to the computer labs and responding to frequent help calls. Some schools can afford to keep an outside expert on retainer, but this is uncommon.

Against a background of rapid and significant curriculum change with new Higher School Certificate courses in every subject, new syllabuses in primary schools and a plethora of policy documents to be implemented each year, many teachers are being left behind. Key issues of access to computers for every teacher, appropriate basic and advanced training, proper technical support and access to subject-specific software need to be addressed now rather than later.

# The pressure to bring technology into the classroom has pushed schools into the arms of the corporate sector.

"Teachers were offered a PC in return for undertaking 30 hours of training," said ICT Manager for the Archdiocese of Sydney Anthony Camillos. According to Camillos, of the 4,030 teachers in the archdiocese, 2,400 underwent the training in the first year and another 1,200 are set to take the program this year. There are almost 200 schools in the archdiocese, and under the Catholic school system, each school controls how they use computers. The archdiocese operates a central office to assist with network compatibility, support, preferred supplier schemes and the training program.

"The free computer only acted as a catalyst for the professional development," he said. "Nearly 90% of the workforce have willingly volunteered to undertake training, which is practically unheard of."

Universities have finally updated education degrees to include compulsory computer training and courses on how to integrate IT into the curriculum. Some universities, such as the Queensland University of Technology, offer specialist IT qualifications for teachers.

Michelle Williams, a lecturer in the Faculty of Education at QUT and the president of the Australian Council for Computers in Education said many teachers have the skills to use technology within a classroom setting, but they are held back by limited or poorly managed resources. "It's difficult to structure and manage work with many students and a handful of computers," she said.

There is now more IT in schools, but Williams remains skeptical that the current technology provides valuable educational outcomes. "Teachers have to use computers in the curriculum so that computing isn't just something that is done on Wednesday afternoon in the lab. That becomes an artificial environment to teach in."

Williams maintains it is the same in the better-equipped independent schools. Special IT programs and laptops sound impressive to parents, she said, but parents need to look beyond the marketing to the quality of the teaching and how computers are used.

## The new schoolyard

Students are crying out to be taught the latest IT skills. Computing studies is now the next largest subject after English in years 11 and 12. The pressure to bring technology into the classroom has pushed schools into the arms of the corporate sector.

The corporate sector is demanding more skilled IT workers from Australia's public education system. However, few companies are investing directly or systematically in the expensive infrastructure schools need to teach the skills industry demands.

IT giants Microsoft and Cisco offer industry certification qualifications to school-age students as part of the curriculum. Cisco marketing manager of education programs Peter Scope sees Cisco's Networking Academy Program as a vocational qualification for the new economy, equivalent to traditional courses such as metalwork or woodwork.

The courses allow senior students to gain industry certification as part of their regular schooling. Students can take courses that would otherwise cost from $8,000 to

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$15,000 for between $40 and $400, or in some cases for free. Already, 700 students have completed the program and 5,000 are enrolled in schools and TAFEs around Australia. About 300 teachers have undertaken the special training qualification required to teach Cisco's curriculum.

For the last two years, the program has been available as an elective outside school hours, but it is now offered as part of the curriculum in the ACT, and Victoria plans to follow. "What we are trying to do is make the education sector more responsive to industry," Scope said.

"The courses are designed to meet the skills gap. We need people to manage and grow the Internet economy. We want graduates to work, not necessarily for Cisco, but for the industry in general." He points to the example of one graduate who left school at 17 and walked into a $45,000 job managing Telstra's regional Internet service providers in Tasmania.

Cisco has designed the curriculum to include everything from building cables to complex networking and computer skills. According to Scope, students learn abstract concepts and problem-solving skills as well as project management and essential mathematics.

He admitted that many educators are initially suspicious of Cisco's motives for offering the program. "Unless we do something for the industry, we will be hit hardest. We want as many students to have access to the program as possible."

Cisco has sunk $20 million into the program, some of which Scope admits is 'soft' money. To run the program, schools must spend $18,000 on Cisco switches and routers, but Cisco has provided the equipment free to some educational institutions. According to Scope, the package has a commercial value of $50,000. However, schools still need a qualified teacher to offer the program. Cisco operates special training centres for teachers, but schools must pay $2,400 for a teacher to undertake the required training.

According to Scope, private schools have been more willing to run the program because they have more flexibility in their IT budgets and staff time. He said Cisco prefers schools to invest their own funds in the program as a sign of their commitment.

However, there is some resistance to the program. The NSW Education Department has blocked NSW students from taking the course as part of their school studies. "The NSW education department has not been forthcoming," Scope said. "I think a lot of it is a legacy thing. It has been a frustrating experience to change, but I think it is just a matter of time."

Brett Clarke views the Cisco program as an effective industry partnership. He has taught the program at a WA school and regards the mix of in-class and online teaching a flexible and effective teaching method.

The increasing involvement of large IT companies in public education has sent a ripple of alarm through educators. Where a school's IT requirements intersect with the commercial interests of multinationals, the education sector is feeling the pressure.

A number of state governments, including NSW and Victoria, have purchased Microsoft licences on behalf of all state schools. The multimillion dollar windfall for Microsoft has angered many schools and teachers. The Queensland Teachers Union staged a boycott of the software after the Queensland Government arbitrarily negotiated a software deal with Microsoft. Teachers claimed the licensing deal would consume 75% of school IT budgets. In 1997, the then Victorian treasurer and minister for multimedia Alan Stockdale criticised Microsoft's "monopoly" position.



"One of the issues is who should be paying who," Clarke said. "Schools are exposing a whole generation to Microsoft's products and teachers are training the next generation in the use of Microsoft products. From my point of view Microsoft should be paying us."

## Apple for the teacher

Apple has cultivated a close relationship with the education sector under a number of professional development schemes. Since 1985 (1996 in Australia), Apple has trained teachers to use Apple products in the classroom under the Apple Classrooms of Tomorrow program. Apple also provides Australian teachers with free Apple hardware and software in exchange for promoting Apple products to other educators under the Apple Distinguished Educator scheme.

Within the Cairns diocese, Kathleen Aulich has worked closely with the local Apple reseller to roll out and maintain the network of computers, 50% of which are Apple products. She said both parties have worked hard to maintain a good relationship, including meeting out of hours. She said each school only selects the products they want and there has been no commercial conflicts of interest or commercial pressure from Apple. However, the Internet is bringing more technology options for teachers and students, and for learning activities.

"Some schools are putting money meant for hardware into Internet access," Clarke said. The Internet has become a catalyst for schools to revamp how they manage their IT. Many schools such as Holy Cross are dedicating resources to building a reliable network. The Sydney archdiocese is planning to establish an ADSL satellite network in every school by the end of the year. Every state government has also pledged to upgrade Internet access. Pam Roberts said Internet access at Junee High School has improved significantly.

According to Clarke, the future of technology in education lies in building networks rather than investing in PCs. "What education systems should do is create the networking infrastructure while students bring their own information appliance."

Clarke likened laptop programs to the way schools used calculators in the 1970s. At first, maths students were not expected to buy their own calculators. Schools purchased a central stash of calculators and allowed students to use them during lesson time. As the hardware became cheaper and smaller, students were required to buy a calculator as part of their stationery list. Holy Cross offers iBooks under the early calculator model. Some well-heeled independent schools require parents to buy a laptop for their children, but this is uncommon.

"There will be a time when access isn't an issue and each student will have their own computer," Clarke said. "Right now, almost all students have computers and often their's is better than the school's." He admits there are equity concerns to overcome under such a model.

"In terms of systemic change, there is still a long way to go if people are honest about it," he said. "Really wonderful things can and do happen, the disappointing thing is that it could be so much better."

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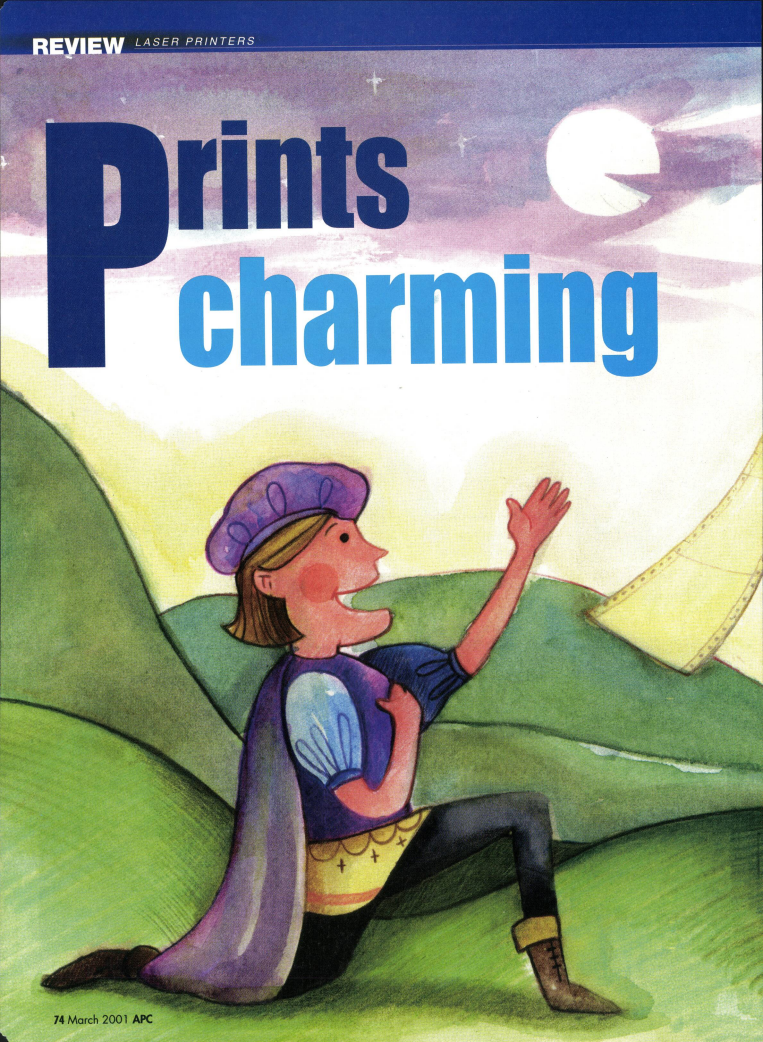
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# Prints charming





*Laser printers are faster, quieter and cheaper than ever before. How can you resist?* ***Darren Ellis*** *takes a look at a wide selection of units, from home printers to corporate behemoths.*

The laser printer market has been growing in the past few years, and for very good reasons. Today's laser printers are faster, quieter, have greater printing capacity, and best of all, prices have dropped.

Before shopping for a printer, it pays to do your homework. Think carefully about what the printer will be used for. Do you need colour or monochrome printing, or both? Is speed more important than print quality? Will you be printing on standard paper or will you be using transparencies, envelopes and labels? What paper and envelope sizes will you need to be able to print? Is the printer for a small or large business, or for the home? What paper capacities do you require? How many people will be using the printer, and do you need to network it?

The printers reviewed here cover the full range of features, functions and prices. The reviewed units range from a $679 home and small office printer right up to a $15,895 corporate printer. If you're shopping for a printer, you'll know that laser printers are more expensive, so why should you buy a laser printer when there are cheaper types of printers available?

## Decisions, decisions

There are three main types of printers: dot matrix, inkjet and laser. For decades, dot matrix printers were extremely popular; initially because no other technology existed, but also because they are extremely cheap to manufacture. There are different types of dot matrix printers, but they all work on the same principle: keys strike paper to make their mark. Printing fine details is difficult for dot matrix printers, because more keys are required to produce more detailed images.

Dot matrix printers are an impact technology, so they are quite loud when printing. Non-impact printing technologies (laser and inkjet) are quieter, and they are also able to produce more detailed images. Inkjet printers work by spraying the image onto a moving piece of paper. The printer sprays dots of varying size (and colour for a colour inkjet) to create the overall image. The paper is then heated to dry the ink. In some colour-intensive printing the paper can end up quite wet, but most high-end printers don't have this problem. Inkjet colour prints are usually brighter and more vibrant than laser prints.

Laser printers use a version of photocopier technology. The laser 'writes' the page to be printed on a drum which is coated with selenium. The laser writing electrically charges the drum, which is then rolled through the powdery toner. This adheres to the charged areas of the drum surface. The toner is transferred onto a sheet of paper, which is then heated and pressurised to fuse the toner onto the sheet. The drum is then discharged and excess toner is collected for reuse. Colour laser printers are more expensive than monochrome laser printers because their toner cartridges require a motor to swap them within the unit.

Initially, laser printers do cost more than inkjets, but they are cheaper to run. The refill cartridges are usually less expensive and last longer. Their greatest advantage is that they generally print faster than inkjets. All of these factors make laser printers ideal for business, but they are also great for the home.

## Canon LBP-1000



The LBP-1000 is a monochrome printer aimed at businesses. It can handle standard paper sizes such as A4 and legal, and small to medium print volumes. The unit is robust, and changing toner cartridges is easy — there's only the one panel to open and the toner unit just slips in.

This printer is capable of 1,200 by 1,200dpi (dots per inch). This is much higher than the 600 by 600dpi or 600 by 1,200dpi offered by most other printers in this review. The test printouts were very clean and clear, particularly the fine details. Print times were comparably slow; the first printout took 15.48 seconds, and five prints took 40 seconds. However, the printer's rating of 10ppm (pages per minute) should be more than adequate for most businesses. The final print quality is high, but it appeared a little faded. This is not very noticeable, and is only evident when compared with printouts from other units.

The LBP-1000 might be too expensive for many smaller businesses, but if you are looking for dependable, high quality printing, this is a good choice.

**Pros** Sturdy, with high resolution printing
**Cons** Software is little more than drivers

**Contact** Canon
**Phone** (02) 9805 2000
**Online** www.canon.com.au
**Price** $1,399

## Epson AcuLaser C2000



The Epson AcuLaser C2000 is one of the fastest colour printers reviewed in this roundup. The first colour printout took 20 seconds, and five colour pages took one minute and eight seconds. This is the second fastest time *APC* recorded and very close to its rating of five colour ppm. Monochrome times (23.6 seconds for the first five sheets) were average compared with the other machines, but the unit was actually faster than its 20ppm rating. Speed aside, the print quality was very good — the blacks were very black in the monochrome printouts, and the gradation from black to white was good. The colours were bright, but the texture was faded.

The printer is extremely easy to set up and use. The driver information is more than adequate for configuration, and the control panel on the unit is easy to read and well laid out. It can print on a wide variety of paper sizes and stock, but not A3 or larger. This is one of the best models reviewed.

**Pros** Easy to set up and use
Capable printing
**Cons** Some fading

**Contact** Epson
**Phone** (02) 9903 9000
**Online** www.epson.com.au
**Price** $5,495

## Epson EPL-5800



This monochrome printer is for the SOHO (small office, home office) market. It is capable of 1,200 by 1,200dpi, higher than most of the machines. Its print times of 12.8 and 38 seconds were average for the printers tested, even when printing at 600dpi, but the printout quality was excellent. It had very sharp definition with no discernible bleeding in the fine details. The greys were solid, but on larger areas of black the finish was a dull matte.

This printer is great for small offices as it can print on a wide variety of paper sizes and stock, including transparencies and envelopes. It's a fairly small unit and has a simple, but unusual design — the 150 sheet cassette protrudes from the bottom. It has a bidirectional parallel port and a USB connection.

The EPL-5800 is also compatible with a wide variety of printing languages, so it would fit into most office environments.

**Pros** Easy to use
Prints at 1,200dpi
**Cons** A little slow

**Contact** Epson
**Phone** (02) 9903 9000
**Online** www.epson.com.au
**Price** $899

## Hewlett-Packard LaserJet 8550DN



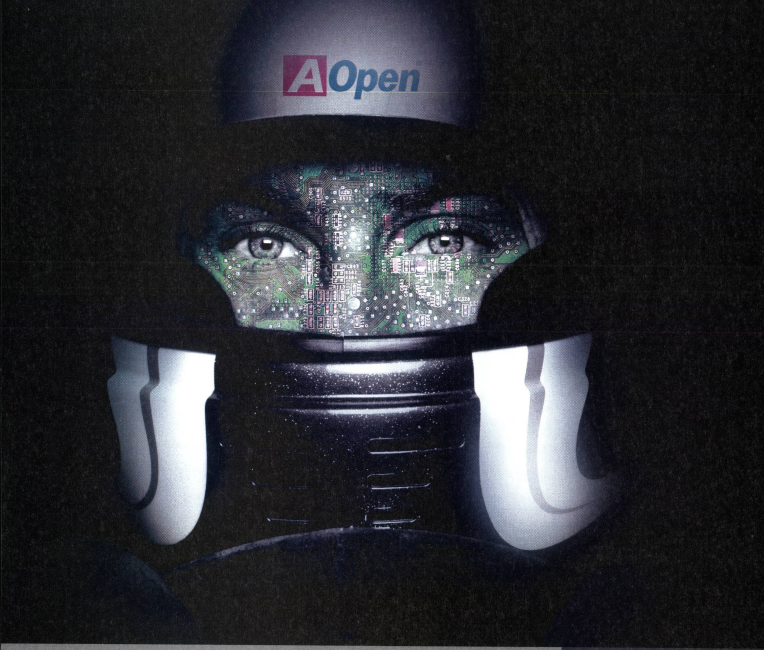
The Hewlett-Packard LaserJet 8550DN dominated *APC*'s testing labs. This printer is designed for high volume corporate settings, and is at the top of Hewlett-Packard's printer range. It can print in colour and monochrome, and holds more paper in its various trays than can be found in the usual office stationery cupboard. Together, the four paper trays hold 3,100 pages from A4 size to executive, but not A3.

It took a while for the unit to warm up, and the first black and white page printed in 14 seconds. The test five pages came in just under 40 seconds. A colour print took 33.49 seconds and five took one minute and 13 seconds. These aren't startling times, but once the unit got up to speed it churned out pages very quickly, particularly in monochrome.

The print quality was very high; the colours were bright and the blacks were very dark and solid. Even the ultra-fine details were evident.

**Pros** Good quality prints
Can print on a wide variety of stock
**Cons** Slow to process single print jobs

**Contact** Hewlett-Packard
**Phone** 13 13 47
**Online** www.hp.com.au
**Price** $15,895




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## Kyocera Mita FS-1000



The Kyocera Mita FS-1000 is a very simple and easy-to-use printer aimed at small to medium businesses. It is a monochrome printer, rated at 10ppm. In *APC*'s timed tests it printed the first sheet in 13.17 seconds and five sheets in 37 seconds. This makes it one of the slowest monochrome printers reviewed. The maximum print quality (600 by 600dpi) is adequate for business uses, but like the Canon LBP-1000, the overall quality was slightly faded — particularly in areas of solid black.

Although not the fastest unit or the printer capable of the highest quality prints, the FS-1000 was the cheapest we reviewed. This could make it worth considering. The paper cassette is larger than most, with a 250 sheet capacity, and it can print on postcard stock, envelopes and labels from A4 to legal size paper. The unit also comes with the Kyocera Mita PrintMonitor software, which is a handy networking tool for monitoring and configuring the printer.

**Pros** Good for home or small business
**Cons** Some print fading

**Contact** Kyocera Mita
**Phone** 1300 364 429
**Online** www.kyocera.com.au
**Price** $679

## Kyocera Mita FS-3800N



The FS-3800N is a real corporate workhorse. Looking a lot like a larger version of the FS-1000, the FS-3800N outstripped nearly every other printer on speed. One monochrome page took only 7.89 seconds, and five pages took only 17.64 seconds. The FS-3800N and the Hewlett-Packard 8550DN are both rated at 24ppm, but the FS-3800N most easily attains that rate.

The print quality was very good, with black areas darker than those produced by the FS-1000, and well defined fine details. The unit can print at a maximum of 1,200 by 1,200dpi in sizes between A4 and legal. It can handle card, envelopes and labels. The cassette holds 500 sheets and the feeder tray 100 sheets, which is a lot more than the 250 sheet standard of most printers in this range.

The printer has bidirectional parallel and 10/100 Ethernet connections, and comes with the Kyocera Mita PrintMonitor software. Setting up the unit is straightforward, and the controls and LCD menu screen are easy to use.

**Pros** Very fast
Easy to set up and use
**Cons** Blacks are a little faded

**Contact** Kyocera Mita
**Phone** 1300 364 429
**Online** www.kyocera.com.au
**Price** $3,023

## Lexmark Optra C710



The Optra C710 is a colour laser printer with a maximum printing resolution of 1,200 by 1,200dpi. The colour prints were clear and bright, and the blacks were very dark and solid. The details on the test sheets came out well, even the smooth gradations from black to white.

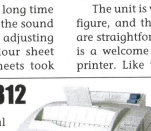
However, the printer took a long time to print the colour sheets, and the sound of the colour toner cartridges adjusting was clearly audible. One colour sheet took 25 seconds, and five sheets took almost two minutes — the longest time in this review. Monochrome prints were much faster; only 6.5 seconds for one sheet and a mere 23 seconds for five. These were some of the fastest times *APC* recorded.

The unit is very easy to set up and configure, and the controls and LCD panel are straightforward. The USB connection is a welcome inclusion for a corporate printer. Like the Lexmark Optra E312, this printer also supports just about every operating system under the sun.

**Pros** Great OS support
Excellent print quality
**Cons** Slow and loud when printing colour

**Contact** Lexmark
**Phone** 1300 362 192
**Online** www.lexmark.com.au
**Price** $5,115

## Lexmark Optra E312



The Optra E312 is a personal laser printer that is also great for small business. It prints in monochrome only and is capable of 600 by 600dpi. This is more than adequate for home use, but its print speeds were far from exceptional. One sheet took 14.5 seconds and five took 40.8 seconds. This is a little slower than its rating of 10ppm. However, the print quality was very good, with well-defined details and solid blacks.

The printer doesn't have a paper cassette, but there's a 150 sheet slot at the back of the unit plus a manual feeder slot. It can print on labels, envelopes, transparencies and card stock as well as paper from A4 to executive sizes. It supports a huge range of operating systems, from Windows 3.1 to Mac OS and many versions of Linux.

It isn't particularly fast and doesn't offer the greatest print quality, but at only $768, this printer won't overstretch your budget.

**Pros** Good printing variety and OS support
Cheap
**Cons** A little slow

**Contact** Lexmark
**Phone** 1300 362 192
**Online** www.lexmark.com.au
**Price** $768

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| Dragon Naturally Speaking 5.0 Mobile | 489 |
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| Filemaker Pro 5.0 3.0 | 435 |
| IBM ViaVoice Millennium (Macintosh) | 195 |
| iShare 3.5 - 5 User Session | 179 |
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| MS Encarta 2001 Deluxe | 115 |
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| MS Office 2000 Value Pack ($1700 value) | 599 |
| MS Press MCSE Core Requirements Win2000 Training | 295 |
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| MS Project 2000 | 899 |
| MS Visio 2000 Professional | 635 |
| MS Windows 2000 Professional | 549 |
| MS Windows 2000 Pro Upgrade FROM 95/98 | 385 |
| MS Windows 2000 Pro Upgrade FROM NT | 259 |
| MS Windows Me Upgrade | 169 |
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| Trellian ImageWolf (Find images/movies on Internet) | 38 |
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| ED AutoCAD 2000 | 269 |
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| ED Borland Delphi 5.0 PRO | 185 |
| ED Corel Draw 10 | 355 |
| ED Corel WordPerfect Office 2000 | 122 |
| ED Filemaker Pro 5.0 | 315 |
| ED Norton AntiVirus 2001 | 55 |
| ED Norton SystemWorks 2001 Professional | 149 |

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|---|---|
| Belkin 4-Port Hub | 89 |
| Belkin FireWire PCI Card | 140 |
| Compaq Ipaq H3630 | 1,149 |
| D-Link PCI Network Card | 49 |
| HP Deskjet 640C Printer (After cashback - Ltd time) | 149 |
| HP Deskjet 640C & Scanjet 4200C | 399 |
| HP Laserjet 1100 | 699 |
| HP Scanjet 4300C (After cashback - Ltd time) | 255 |
| Iomega 100MB USB Zip Starter Kit | 245 |
| Iomega HipZip Digital Audio Player | 565 |
| Iomega Mega Twin Bundle | 389 |
| Iomega ZipCd Internal 32x8x4 Writer | 379 |
| Lexmark Z11 Printer | 109 |
| LG 15" / 17" Monitor | 255/385 |
| Microsoft Intellimouse Optical | 79 |
| Microsoft SideWinder FreeStyle Pro | 75 |
| Minolta QMS 1100L Laser Printer | 475 |
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## OKI C7200



The OKI C7200 colour laser printer was faster than any of the other colour printers when printing *APC*'s colour test sheets. The first sheet took 15.88 seconds and five sheets took only 35.76 seconds. This is almost the same amount of time this printer (and others in this roundup) took to print the monochrome test sheets. The colour print quality was also excellent; the colours were sharp, clear and crisp. The black and white printouts were equally good, but the ink was a little shiny.

This is a big printer that can hold 530 sheets in one tray and 100 sheets in a separate slot. It can handle A4 to executive-sized sheets (no A3) and a variety of envelope sizes, plus it can print on transparencies. It matched its rating of 12ppm for colour, but trailed its monochrome rating of 20ppm. The speed for monochrome was closer to 12ppm.

There's a bidirectional parallel connection and a USB connection.

**Pros** Very fast with colour
Great print quality
**Cons** Monochrome slower than rated

**Contact** OKI
**Phone** (02) 9690 8200
**Online** www.oki.com.au
**Price** $7,148

## OKI OKIPAGE 14i



The OKIPAGE 14i is a small to medium volume monochrome printer for small to medium businesses. It looks like a personal printer, but prints more quickly than most.

Equalling the Lexmark Optra C710 in speed, it printed our test page in 6.5 seconds and had all five printed in 23.76 seconds. This makes it one of the fastest printers reviewed. The print quality was very good — the black was solid and the gradations from white to black were fine and smooth. Transparencies, card stock and envelopes can be printed, as well as paper from A4 to executive size.

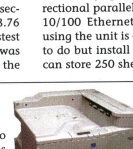
The OKIPAGE 14i has most connectivity options covered. It has a bidirectional parallel port, a USB port and a 10/100 Ethernet port. Setting up and using the unit is easy — there is nothing to do but install the drivers. The printer can store 250 sheets in a slot, and a 250 sheet cassette is an optional extra.

This is a fast printer, with good quality prints and a small footprint.

**Pros** Small and fast
**Cons** Drivers don't allow detailed control

**Contact** OKI
**Phone** (02) 9690 8200
**Online** www.oki.com.au
**Price** $1,375

## Ricoh Aficio AP2700



A large, squat printer, the Ricoh Aficio AP2700 is the only machine in this review that can print on A3. Designed for corporate environments, it has two 500 sheet paper trays and a high rating of 27ppm, which it easily matched. This was the fastest monochrome printer tested. It took only 4.5 seconds for the first page and 12.89 seconds for all five.

The unit's maximum print resolution is 600 by 600dpi. The blacks in the test pages were not the darkest we saw in our tests, but the fine details were very clear. Similarly, the gradation from black to white was not the finest, but quite sufficient for everyday printing. The printer comes with management software and configuration software, which is extremely handy for networked environments. There's a bidirectional parallel port and 10/100 Ethernet port.

The Aficio AP2700 is more expensive than most of the other printers here, but it more than makes up for this with good performance and features.

**Pros** Fast printing
Can print A3
**Cons** Below average print quality

**Contact** Ricoh
**Phone** (03) 9888 7722
**Online** www.ricoh.com.au
**Price** $4,720

**EDITOR'S CHOICE**
Australian Personal Computer

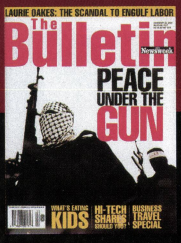
**OKI C7200**
**Highly commended**
Lexmark Optra C710

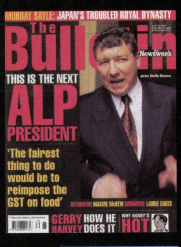


There were several great printers in this roundup. The hulking Hewlett-Packard 8550DN has nearly every possible feature and function a large corporation could ever want, and the blazing Ricoh Aficio AP2700 has breathtaking speed. However, the Editor's Choice goes to the OKI C7200 which was fast for both colour and monochrome printing, and has the high quality and large paper capacity medium to large businesses need.



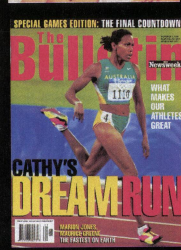
*APC* highly commends the Lexmark Optra C710, which was also a very competent printer, with good print times and quality.










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## How we tested

Each printer was tested using only the materials and information supplied in the box. Ease of setup, installation and troubleshooting were compared. The quality of the manual, quantity of supplied software and availability of connector cables were also taken into consideration. USB connections are enabled on some of the review models, but all machines were tested using bidirectional parallel print cables or 10/100 Ethernet to ensure uniform print conditions.

Software drivers were individually loaded onto the test machine and the print heads aligned and calibrated where possible. Three test files were printed where applicable. Two were similar — they used a range of fonts, styles and sizes of text from 8pt up to 18pt, as well as some graphics. One version was monochrome, the other multicoloured. The third test file was used to gauge the printer's ability to print fine details and grading from black to white.

All tests were timed from the point when the software signalled printing had started or when paper feed commenced. Spool time was ignored. Timing finished when the printed page was ejected. The first test involved printing a single sheet. The second involved printing five sheets.

To ensure standard conditions, Gold Medal copier paper was used for all the tests.

| Product | Canon LBP-1000 | Epson AcuLaser C2000 | Epson EPL-5800 | Hewlett-Packard LaserJet 8550DN | Kyocera Mita FS-1000 |
|---|---|---|---|---|---|
| **Contact** | Canon | Epson | Epson | Hewlett-Packard | Kyocera Mita |
| **Phone** | (02) 9805 2000 | (02) 9903 9000 | (02) 9903 9000 | 13 13 47 | 1300 364 429 |
| **Online** | www.canon.com.au | www.epson.com.au | www.epson.com.au | www.hp.com.au | www.kyocera.com.au |
| **Price** | $1,399 | $5,495 | $899 | $15,895 | $679 |
| **Warranty** | 1 year RTB | 1 year onsite (with conditions) | 1 year RTB | 1 year onsite | 3 years onsite |
| **Specifications** | | | | | |
| **Memory** | 4M (36M max) | 32M (512M max) | 16M (256M max) | 64M (512M max) | 4M (132M max) |
| **Printer languages supported** | PCL 6 emulation, Adobe PostScript 3 (optional) | ESC/P2, FX, IBM, PCL 5e, Adobe PostScript 3 (optional) | EPSON GL/2 FX, ESC/P2, IBM, PCL 5e, PCL 6, Adobe PostScript (optional) | Adobe PostScript 3, PCL 5e, PDF | Diablo 630, Epson LQ-850, INM Proprinter X24E, Line Printer, PCL 6, Adobe PostScript 2 emulation (optional) |
| **Connectivity** | 2 parallel, 10/100 Ethernet, USB (optional) | Parallel, 10/100 Ethernet | IEEE bidirectional parallel, USB | IEEE bidirectional parallel, 10/100 Ethernet, spare parallel | IEEE bidirectional parallel, 10/100 Ethernet (optional) |
| **Maximum dpi** | 1,200 by 1,200 | 600 by 600 | 1,200 by 1,200 | 600 by 600 | 600 by 600 |
| **Rated colour (ppm)** | N/A | 5 | N/A | 6 | N/A |
| **Rated monochrome (ppm)** | 10 | 20 | 10 | 24 | 10 |
| **Paper sizes supported** | A4, letter, legal | A4, A5, B5, letter, executive | A4, A5, B5, letter, legal, half-letter, executive, g-letter, government legal, government letter | A4, B4, legal, letter, tabloid, executive | A4, A5, B5, letter, legal, custom |
| **Paper stock types supported** | Plain | Plain, colour laser paper, colour laser transparency, envelope | Plain, transparency, envelope | Plain, recycled, laser, labels, transparency, | Plain, recycled, labels, card, envelope |
| **Paper trays/autofeeder slots** | 250 sheet cassette, 100 sheet tray, 250 sheet tray (optional) | 500 sheet cassette, 150 sheet tray, 500 sheet cassette (optional) | 150 sheet cassette, 500 sheet tray (optional), 100 sheet bypass tray (optional), 2,000 sheet LCT | 4 trays (3,100 sheets total capacity) | 250 sheet cassette, 50 sheet tray |
| **Dimensions (h by w by d in cm)** | 23.2 by 39.9 by 41.4 | 51.1 by 46.3 by 54.8 | 33.8 by 38.7 by 47.5 | 124.4 by 66 by 68.6 | 22.2 by 37.7 by 37.4 |
| **Weight (kg)** | 8.5 | 44.5 | 7 | 101 | 9.5 |
| **Operating systems supported** | Windows 95/98/NT | Windows 95/98/NT/2000 | Windows 3.1/95/98/NT | Windows 95/98/NT/2000, Mac OS 7.0 onwards, OS/2, AutoCAD | Windows 3.1/95/98/NT |
| **Test results** | | | | | |
| **Colour: one page (seconds)** | N/A | 20 | N/A | 33.49 | N/A |
| **Colour: five pages (seconds)** | N/A | 1 minute 08 | N/A | 1minute 13 | N/A |
| **Monochrome: one page (seconds)** | 15.48 | 11.6 | 12.82 | 14.9 | 13.17 |
| **Monochrome: five pages (seconds)** | 40.16 | 23.6 | 38.4 | 33 | 37 |

| Product | Kyocera Mita FS-3800N | Lexmark Optra C710 | Lexmark Optra E312 | OKI C7200 | OKI OKIPAGE 14i | Ricoh Aficio AP2700 |
|---|---|---|---|---|---|---|
| **Contact** | Kyocera Mita | Lexmark | Lexmark | OKI | OKI | Ricoh |
| **Phone** | 1300 364 429 | 1300 362 192 | 1300 362 192 | (02) 9690 8200 | (02) 9690 8200 | (03) 9888 7722 |
| **Online** | www.kyocera.com.au | www.lexmark.com.au | www.lexmark.com.au | www.oki.com.au | www.oki.com.au | www.ricoh.com.au |
| **Price** | $3,023 | $5,115 | $768 | $7,148 | $1,375 | $4,720 |
| **Warranty** | 3 years onsite | 1 year onsite | 1 year onsite | 1 year onsite | 1 year RTB | 3 years RTB |
| **Specifications** | | | | | | |
| **Memory** | 16M (272M max) | 32M (384M max) | 4M (68M max) | 64M (1G max) | 8M (40M max) | 16M (80M max) |
| **Printer languages supported** | Adobe PostScript 2, Diablo 630, Epson LQ-850, IBM Proprinter X24E, line printer, PCL 6 | Adobe PostScript 3 emulation, PCL 5e emulation, PCL 6 emulation | Adobe PostScript 2 emulation, PCL 6 emulation, PPDS | Adobe PostScript 3 emulation, HP Color LaserJet 5 emulation, PCL 6 | Adobe PostScript 2 emulation, Epson FX, IBM Proprinter, PCL 6 emulation | Adobe PostScript 3, PCL 6 emulation |
| **Connectivity** | IEEE bidirectional parallel, 10/100 Ethernet | IEEE bidirectional parallel, USB, 10/100 Ethernet | IEEE bidirectional parallel, USB | IEEE bidirectional parallel, USB | IEEE bidirectional parallel, USB, 10/100 Ethernet | IEEE bidirectional parallel, 10/100 Ethernet |
| **Maximum dpi** | 1,200 by 1,200 | 1,200 by 1,200 | 600 by 600 | 600 by 1,200 | 600 by 1,200 | 600 by 600 |
| **Rated colour (ppm)** | N/A | 3 | N/A | 12 | N/A | N/A |
| **Rated monochrome (ppm)** | 24 | 16 | 10 | 20 | 14 | 27 |
| **Paper sizes supported** | A4, A5, B5, letter, legal, custom | A4, A5, B5, letter, legal, executive | A4, A5, B5, letter, legal, executive | A4, A5, A6, B5, letter, legal, executive | A4, A5, A6, B5, letter, legal, executive | A3, A4, A5, A6 |
| **Paper stock types supported** | Plain, recycled, labels, card, envelope | Plain, labels, transparency, card, envelope | Plain, labels, transparency, card, envelope | Plain, transparency, envelope | Plain, transparency, card, envelope | Plain |
| **Paper trays/autofeeder slots** | 500 sheet cassette, 100 sheet tray | 250 sheet drawer, 50 sheet tray, 2 x 250 sheet drawers (optional) | 150 sheet tray | 530 sheet tray, 100 sheet slot, 2 x 530 sheet trays (optional) | 250 sheet slot, 250 sheet cassette (optional) | 2 x 500 sheet trays, 2,000 sheet LCT, 2 x 500 sheet trays (optional), 100 sheet bypass tray (optional) |
| **Dimensions (h by w by d in cm)** | 30 by 34.5 by 39 | 40.5 by 47 by 57 | 22.4 by 34.5 by 36.4 | 43 by 43 by 62 | 21.5 by 34.5 by 39.5 | 51.6 by 52 by 55 |
| **Weight (kg)** | 13 | 52 | 7.5 | 47.5 | 10 | 40 |
| **Operating systems supported** | Windows 3.1/95/98/NT | Windows 3.1/95/98/Me/NT/2000, Mac OS 7.5 onwards, Linux, Unix, OS/2, AS/400 | Windows 3.1/95/98/Me/NT/2000, Mac OS 7.5 onwards, Linux, Unix, OS/2, AS/400 | Windows 3.1/95/98/NT, Mac OS | Windows 3.1/95/98/Me/NT/2000, Mac OS 8.1 onwards | Windows 3.1/95/98/NT, Mac OS 7.1 onwards |
| **Test results** | | | | | | |
| **Colour: one page (seconds)** | N/A | 25 | N/A | 15.88 | N/A | N/A |
| **Colour: five pages (seconds)** | N/A | 1 minute 52 | N/A | 35.76 | N/A | N/A |
| **Monochrome: one page (seconds)** | 7.89 | 6.5 | 14.5 | 16.13 | 6.5 | 4.5 |
| **Monochrome: five pages (seconds)** | 17.64 | 23 | 40.8 | 35.53 | 23.76 | 12.89 |


LANGUAGE
bgcolor=
onavbar.gif
92.21"
164.21"
286.21"
415.21"

# Zip it

*The capacity of hard drives is constantly increasing, so you might be forgiven for thinking that compression utilities are a thing of the past. However, they are as important as ever, thanks to the Internet and the need for files to be as small as possible to facilitate fast downloads.* ***Alex Kidman*** *investigates some compression options.*

Compressing files used to be a popular way of conserving hard disk space, but compression is useful regardless of how large your hard drive is. One of its main attractions is that it makes files faster to download from the Net.

Compression utilities examine the content of files and apply a group of equations to them to identify standard patterns. For example, in a text file every instance of the letter 'e' (the most common letter in English) could be located. For every appearance after the first, the letter could be represented with an instruction to look back to the first instance. If you took a sentence and replaced every instance of the letter 'e' after the first with a '1', you'd end up with sentences like 'We hav1 nothing to f1ar but f1ar its1lf.' When applied to an entire document, this process makes the file smaller.

This works best when the symbol is much shorter than the instance it represents. In the above example, if you use '1' to represent 'have' instead of just 'e', you end up with an even shorter sentence. Most utilities come with decompression algorithms already installed, so you don't even need to include the decompression instructions in the compressed file.

For more complex files, such as image or sound files, the compression algorithms are more complicated. Even for text files, most utilities use more complicated compression methods than those in our example.

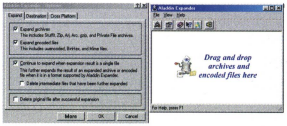
## Speed or size?

The biggest consideration when choosing a compression utility is the trade-off between the speed of the utility and the size of the compressed files. A utility that can compress 100M files in four seconds sounds great, but if the files end up at 99.9M, you haven't achieved much. Conversely, reducing your 100M file to 1M also sounds great, but if it takes three weeks to compress, you might as well mail out the file on floppies — they'll reach your intended recipients faster.

The appropriate balance between time and file size is largely a matter of personal choice, but as *APC* found during testing, different compression methods can produce surprisingly different time and size results. Data integrity is also important. If your newly compressed 1M file can't be decompressed, you've wasted your time. We came across no errors in our testing, but it's worth checking any created archive before making it available to others. This could save a lot of time and pain.

For most people, the choice of compression format is made for them. If you're running a PC, most compressed files you come across will be in ZIP format, and if you're compressing a file you want others to access, ZIP is the best choice as it's so common. On the Mac side, StuffIt's SIT format rules the roost. This doesn't mean that other formats are redundant, they're just less common. If you find a format that works for you, the only other consideration is your target audience. There's no point in sending out a file that can't be decompressed at the other end.

# Aladdin Expander 5.1




Aladdin Expander is bundled with StuffIt (see below), and it wouldn't merit consideration except that it's free. Like 1 Click Unzip (see below), it's an expansion program only so it doesn't compress files.

Expander's interface is reasonably simple: you drag and drop archives into it. Double-clicking on compressed files also launches it. It supports SIT, ZIP, ARC and GZIP files. The decompression time for our test ZIP file was a little slow at 18 seconds.

Expander is included in the Aladdin packageto encourage you to purchase StuffIt, and while it shows some of StuffIt's flair, it compares poorly to other free applications reviewed.

**Pros** Free
**Cons** Better freeware exists

**Contact** Aladdin Systems
**Phone** N/A
**Online** www.aladdinsys.com/expander
**Price** Free

# Aladdin StuffIt 5.5



The name StuffIt doesn't immediately inspire confidence, but this product is definitely worth a look. It was the slowest compressor *APC* tested, but it topped our test results for compression ratios.

StuffIt used its own SIT compression format to achieve a test file size of 7,516K. This is about 200K smaller than the average achieved by other compression utilities. SIT also has the advantage of being a cross-platform format, and is practically the default compressed file format for the Macintosh. In our testing, the Mac version of StuffIt was a little faster than the PC version.

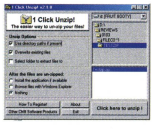
StuffIt took 77 seconds to compress our test file. Considering the average was only 16 seconds, and the next worst result was about 30 seconds faster, this is a significant failing.

StuffIt takes the form of a file browsing utility, which is easy to use and was quite fast at examining the archives *APC* gave it.

**Pros** Best compression
**Cons** Slowest compression

**Contact** Aladdin
**Phone** N/A
**Online** www.stuffit.com
**Price** $US29.95

# CMB 1 Click Unzip 2.1




This is another decompress-only utility — and if your only contact with compressed archives is when you have to decompress them, that's all you need. It does a good job of decompressing, but not quite with a single-click.

1 Click Unzip decompresses ZIP files only, which isn't very impressive considering the other decompress-only utility in our review (Aladdin Expander, see above) supports other formats.

1 Click Unzip had the second best decompression time for our test archive, behind WinZip. In any case, there wasn't a lot of variation in decompression performance between the different utilities.

The program allows any detected setup files to be run once unzipping has taken place, and has a simple display to allow you to work out where decompressed files should be placed. A lot of the utilities we looked at are free, so 1 Click Unzip's price is a definite disadvantage.

**Pros** Simple unzipping procedure
**Cons** Some better alternatives are free

**Contact** CMB Software
**Phone** N/A
**Online** www.cmbsoftware.com
**Price** $US9.95

# efront Power Archiver 2000 6.0



Most free compression utilities support only one archive type (usually ZIP). Power Archiver decompresses ZIP, ACE, RAR, CAB, LZH and many others, but it can only compresses into ZIP.

Power Archiver emulates WinZip visually, but there are several differences. The most notable difference is the help files, which are detailed and full of screenshots. It also supports skins for the toolbar — not a functional enhancement, but fun. Like most of the utilities *APC* examined, Power Archiver can run setup utilities if they're contained within a ZIP.

Power Archiver's compression rate was average: it zipped the test file at 7,773K in 15 seconds. This is slightly faster than average and highly commendable for a free utility. Decompression time was average; it took 17 seconds to unzip our test archive.

Power Archiver is a very good choice with more features than the other free options.

**Pros** Many features for a freebie
Support for multiple archive types
**Cons** Only ZIP compression

**Contact** efront
**Phone** N/A
**Online** www.powerarchiver.com
**Price** Free

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MP9120A

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Dealers Wanted

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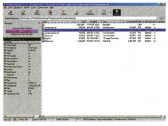
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website: www.galas.com.au
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| Sydney: | 11 Burrows Road (south), St Peters, NSW 2044. | Tel (02) 9550 6888 | Fax (02) 9550 4299 |
| Melbourne: | 5 Bando Road, Springvale, VIC 3171. | Tel (03) 9540 3899 | Fax (03) 9540 3866 |
| Brisbane: | 22 Austin Street, Newstead, QLD 4006. | Tel (07) 3852 4088 | Fax (07) 3852 6166 |

## e-merge WinACE 2.0



WinACE has perhaps the most information-rich and polished interface of all the utilities *APC* looked at. It is styled on Windows Explorer, with an easy-to-use information bar on the left side of the screen.

WinACE supports compressing in ZIP, LHA, CAB and its own ACE format. As is common, it claims to have great compression in its own format. ACE has a good compression rate; it came in third, behind StuffIt and WinRAR. Impressively, it was faster than both these compressors, taking only 28 seconds to complete its task. That's still 10 or more seconds slower than most of the ZIP archives, but almost twice the speed of RAR, and nearly three times faster than StuffIt. Decompression was less impressive; it took 22 seconds to unpack our test file.

ACE is a good format, but if you use it you need to make sure your target audience has WinACE to unpack it.

**Pros** Compression and speed well balanced
**Cons** ACE format not common

**Contact** e-merge
**Phone** N/A
**Online** www.winace.com
**Price** $US29 or free with advertising

## PKZip for Windows 4.0



PKZip has a long history. Many *APC* staffers still remember the exact command line to create a multidisk spanning archive utilising maximum compression rates. PKZip is nowhere near as prominent as it used to be, but it's still a good utility with excellent compression speeds.

PKZip was the second fastest compression utility we came across. Its 13-and-a-half second time was only one-and-a-half seconds longer than WinZip's effort. Compressed size was right on average at 7,756K. Decompression time was also average at 17 seconds.

PKZip has an excellent interface. It's a combination of WinZip's big button compression interface and a StuffIt-style browser. To avoid the subscription fee, a free ad-sponsored version is available. The ad banner sits at the bottom of the screen.

**Pros** Fast compression
Quality interface
**Cons** Average compression sizes

**Contact** PKWARE
**Phone** N/A
**Online** www.pkware.com
**Price** $US39.95 or free with advertising

## RealNetworks NetZip 7.5.1.86



RealNetworks, best known for RealPlayer, has made an unexceptional contribution to the compression market with NetZip.

The basic NetZip interface is very easy to follow, but is presented in an unattractive shade of brown. Like WinZip, its primary focus is on ZIP compression files. However, unlike WinZip, NetZip managed to make a larger than average ZIP file. Most utilities produced identical 7,773K ZIPs, but NetZip's compression created a 7,801K file. This might not seem like a big difference, but it's important if someone downloading your file gets an error in that last 28K.

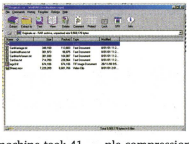
NetZip's speed was closer to the average; it took 15 seconds to compress files and 16 to decompress them. That's not bad, but it's not particularly impressive either.

Real Download Manager is included with NetZip. The two make quite a good combination.

**Pros** Simple interface
**Cons** Compressed files a little large

**Contact** RealNetworks
**Phone** N/A
**Online** www.netzip.com
**Price** $US29.99

## WinRAR 2.80



RAR is nowhere near as well known a compression format as ZIP, but it does have some advantages over ZIP.

WinRAR created the second smallest archives of all the compression utilities *APC* tested, but this came at a price. Compressing on our test machine took 41 seconds, which is more than two-and-a-half times slower than the average. Of course, if file size is the most important issue for you, this isn't too bad. For decompressing files, it was slightly slower than average at 17 seconds.

WinRAR is relatively easy to use, but the plethora of options it presents could scare beginners away. It has everything from multiple compression formats to disk and file size spanning.

The interface is very like WinZip, with the usual range of large icons for set tasks such as creating archives and expanding existing ones.

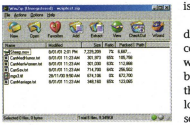
**Pros** Good compression ratio
**Cons** Slow compression time
Rather expensive

**Contact** Rarsoft
**Phone** N/A
**Online** www.rarsoft.com
**Price** $79

# WinZip 8.0

Many people are familiar with WinZip; it's on every *APC* cover CD and is the main reason why ZIP has become a common Net format.

WinZip 8.0 is more evolutionary than revolutionary. It's still user friendly, and has an entirely wizard-driven interface. It supports drag-and-drop, context menus and varying levels of compression. In the past, it relied on PKZip for file spanning, but that is no longer the case.



In our testing, WinZip did quite well. Its best compression size of 7,773K was right on the average, but it was much faster than any other utility we looked at; it took only 12 seconds to perform a compression. Decompressing was equally speedy; our test archive took only 14 seconds to complete.

WinZip's interface is extremely easy to use, even in its slightly more complicated 'classic' mode. In fact, it's so easy to use, some of the other utilities we looked at have copied it shamelessly.

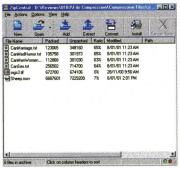
**Pros** Fast

**Cons** Only ZIP format for compression

**Contact** WinZip Computing
**Phone** N/A
**Online** www.winzip.com
**Price** $US29

# ZipCentral

ZipCentral is another utility that imitates WinZip. Normally this would mean *APC* wouldn't review it, but ZipCentral has something in its favour — it's free.



ZipCentral's interface looks almost identical to WinZip's, except that it's blue. Copyright issues may well be pending, but in the meantime ZipCentral is quite easy to use for creating and decompressing archives — as long as you use ZIP. If you're familiar with the WinZip interface, you'll be very comfortable operating ZipCentral.

In *APC*'s tests, ZipCentral's compression produced a by now very familiar 7,773K file, but did so in the third best time of 14.5 seconds. It also managed to decompress *APC*'s test archive in 16 seconds, which put it in the middle of the pack for decompression times.

If you only use ZIP files, ZipCentral is an excellent choice. It does more than many other free utilities such as Aladdin Expander or 1 Click Unzip, and is speedy enough for most needs.

**Pros** Free

**Cons** ZIP only

**Contact** ZipCentral
**Phone** N/A
**Online** members.nbci.com/zipcentral
**Price** Free

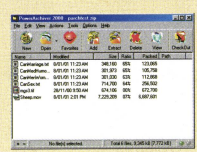
EDITOR'S CHOICE
Australian Personal Computer

## efront Power Archiver 2000 6.0

**Highly commended**
WinZip 8.0

Power Archiver performed very well in *APC*'s tests. It didn't top any, but it consistently came in second. It has excellent help files for those unfamiliar with compression, and its WinZip-style interface makes it easy to use. It's also free.

WinZip performed exceptionally well in our testing, achieving the fastest compression times and a good decompression rate. It's easy to use and has an interface that other utilities mimic. As they say, imitation is the sincerest form of flattery.



# How we tested

There are two main issues with compression software: how quickly and completely the data is compressed, and how quickly compressed files can be decompressed.

To test compression facilities, three large text files, one image file and a video file were compressed into a single archive. Text files are very compressible as there is a lot of repetition of similar components (letters, symbols and so on). However, image files vary markedly, depending on image resolution, and most computer-based video is already heavily compressed. The total size of the uncompressed files was 9.12M. *APC* took note of how much each of the utilities compressed the files.

All file compressions were done at the maximum level available. This tested how compact the files could be made. It also tested error rates, as errors are more likely to occur at high compression levels. No-one wants to create archives that don't decompress properly.

To test decompression, the utilities decompressed the created archives and were timed accordingly. Those utilities that support ZIP archives also decompressed a 13M ZIP file.


SONY
PHILIPS

# The Dot Pitch

*Bigger* is *better when it comes to monitors, but size isn't the only issue to consider.* ***Darren Ellis*** *looks at a range of 17in CRT and flat-panel LCD monitors to rate the budget and deluxe alternatives.*

The standard size of monitors packaged with PCs jumped from 14 to 15in about three years ago, but the allure of a bigger screen is hard to resist. There are plenty of models on the market up to 21in in size, but it's 17in monitors that are selling well. This is because they're the next step up from 15in, in price as well as size.

It seems that every time *APC* reviews monitors, the same observation is made: prices haven't dropped much since the previous review. Another year has passed, and once again prices are roughly what they were 12 months ago. However, even though prices have remained reasonably static, performance has improved dramatically.

## Behind the screen

Flat-screen CRT (cathode ray tube) monitors — the 'tron' range — are selling well, and curved screen shadow mask monitors look to be on the way out. In shadow mask monitors, the picture is beamed through a perforated metal plate. The resulting image is made up of coloured dots on the screen. This is much the same technology your television uses. The advantage of these CRTs is that they are cheap to construct.

Flat-screen tron monitors use an aperture grille instead of a metal plate to beam the image through. The aperture grille is constructed from tightly strung wires, so the image is composed of vertical lines of light. The image on aperture grill monitors is cleaner and better defined than on shadow mask monitors. However, they are more expensive to manufacture and have two slightly visible lines produced by the horizontal wires that keep the vertical wires taut and uniformly spaced.

These two types of CRT screen produce very different results. Mind you, even monitors using the same tubes can have different display properties. In our CRT reviews there are three monitors with the same Mitsubishi Diamondtron tubes. The Mitsubishi Diamond View was our baseline model and scored 8 across the board, but the Hitachi CM625 scored less and the Auriga ColorPro 17D did better in some tests.

## Flat-panel displays

There are also two types of flat-panel LCD (liquid crystal display): passive matrix (usually just called LCD) and active matrix or TFT (thin film transistor). Each pixel in an LCD screen is individually controlled to produce colours. There are a lot of pixels and a lot of possible colours for each pixel, which means a lot of fiddly manufacturing and a higher price tag. For a detailed description of how LCD panels work, see *APC* January, page 120.

*APC* received a variety of screens for review. These ranged from business and home monitors to professional monitors capable of the higher resolutions and refresh rates usually required for CAD/CAM or design work.

To find out how the monitors were evaluated, see 'How we tested' (page 100). It details what each monitor was checked for and explains what is meant by the 'baseline' in the reviews.

# CRT monitors

## ADI MicroScan G700i



The ADI MicroScan G700i is a professional monitor. It scored very well in the image sharpness tests, but the brightness was not very good. This had an adverse effect on the colour quality and overall quality at a distance. The contrast was very sharp, so the monitor scored highly in image and colour sharpness, as well as in text readability.

The onscreen display was not easy to operate. It was pictographic and unlabelled, so some of the functions were not very clear. It's inconvenient to have to dig through the manual each time you need to reconfigure the display.

**Pros** Great image sharpness
**Cons** Poor onscreen display and brightness

**Contact** AKA Technology
**Phone** (02) 9630 1588
**Online** www.akatech.com.au
**Price** $560

## Auriga ColorPro 17D



The Auriga ColorPro 17D is one of three flat-screen monitors in this review with a Mitsubishi Diamondtron tube.

The colour quality and definition were excellent — both scored above the baseline. The onscreen display is controlled by a button and wheel combination and was easy to use. Image sharpness and quality at a distance was the same as the baseline, but the text readability and brightness were inferior. The ColorPro is a cheap home monitor with some attractive features.

**Pros** Great colour quality
**Cons** Poor brightness and text definition

**Contact** AKA Technology
**Phone** (02) 9630 1588
**Online** www.akatech.com.au
**Price** $599

## CTX PR711F



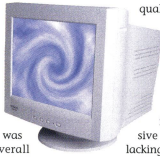
Another flat-screen monitor, the PR711F is from CTX's professional range of displays. In *APC*'s tests, the brightness of the CTX's screen was greater than the baseline, and this brightness boosted colour quality. The text was not as clear as the baseline and the onscreen display was not quite as good, but the CTX's good image and sharp colour made it the baseline monitor's equal.

This isn't a USB monitor — it uses a standard VGA connector — but there are four powered USB ports located in the monitor base which are a very useful extra.

**Pros** Four powered USB ports
Good brightness
**Cons** Text was not sharp

**Contact** Ocean Office Automation
**Phone** 13 22 86
**Online** www.ctxintl.com
**Price** $683

## Hitachi CM625



Like the Auriga, the Hitachi CM625 has a Mitsubishi Diamondtron flat-screen tube. It wasn't as bright as the baseline monitor's, even though they both had the same tube, nor was the text as readable. The image and colour sharpness were the same as the baseline, as was the colour quality and overall quality at a distance. The onscreen display was simple to use, but the button configuration wasn't as effective as others in this review. In some tests the CM625 lagged slightly behind the baseline monitor.

The Hitachi is a good monitor, but it's a little more expensive than similar models and is lacking in some important areas.

**Pros** Flat screen with good image and colour quality
**Cons** Not bright enough

**Contact** Hitachi
**Phone** (02) 9888 4100
**Online** www.hitachi.com.au
**Price** $795

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Asia Pacific Headquarters:
Tel: 886-2-2248-4072, Fax: 886-2-2240-8238.

| | PF790 | PF775 | EF70 |
|---|---|---|---|
| CRT Size | 19"(18.0") | 17"(16.0") | 17"(16.0") |
| Dot Pitch | 0.25mm(AG) | 0.25mm(AG) | 0.25mm(AG) |
| Max. Resolution | 1600x1280 | 1600x1280 | 1280x1024 |

3 year ON-SITE Warranty

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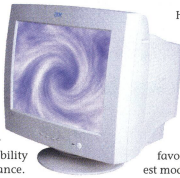
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## IBM E74



This monitor is the odd one out in our review. It is the only model with a normal CRT rather than a flat display. The difference in technology showed up in our tests, where the displayed images were not as sharp as the baseline monitor's. This produced lower scores for image sharpness, text readability and overall quality at a distance.

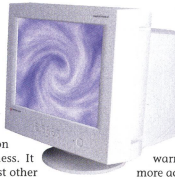
However, the IBM's colour sharpness and quality equalled those of the baseline monitor. The onscreen display was one of the best we reviewed; once configured, there's little need for fiddling later.

Also in the IBM's favour is that it is the cheapest model *APC* reviewed.

**Pros** Good colour quality and onscreen display
**Cons** Slightly lacking in definition

**Contact** IBM
**Phone** 13 24 26
**Online** www.ibm.com.au
**Price** $549

## Mitsubishi Diamond View DV17NF



When *APC* last reviewed monitors (*APC* January 2000, page 90) the Mitsubishi Diamond View 1995 was used as the testing baseline model. This time we used the Diamond View DV17NF.

The monitor has a flat Diamondtron picture tube and was particularly strong on text readability and brightness. It was also very easy to use. Most other screens did not match the Mitsubishi's image or colour sharpness.

It has a handy autoconfiguration function and the onscreen display is well organised. The three-year onsite warranty makes the price more acceptable.

**Pros** Flat screen
Three-year onsite warranty
**Cons** Other models have better picture definition

**Contact** Mitsubishi Electric
**Phone** (02) 9584 7777
**Online** www.mitsubishi-electric.com.au
**Price** $799

## Philips 107T



The Philips 107T flat-screen monitor was the smallest CRT submitted for review. In tests, its excellent image and colour sharpness, great colour quality and ease of use put it ahead of the pack. However, due to a problem with high-contrast switching, the text was a little fuzzy compared to the baseline.

The screen uses LightFrame technology. This can be applied to the whole screen or to a selected area. It boosts the brightness and contrast, making moving or still images look as clear as television images. The difference this feature makes is remarkable.

**Pros** An excellent display for most purposes
LightFrame technology
**Cons** Text was slightly unclear

**Contact** Philips Electronics
**Phone** (02) 9925 3333
**Online** www.philips.com.au
**Price** $629

## ViewSonic PF775



This monitor is aimed at designers and CAD/CAM operators, and is the most expensive model of all those submitted for review. It excelled in every regard except brightness, where it equalled the baseline.

The image and colour sharpness were unsurpassed, as was the overall quality at a distance. The text readability and colour quality were also high. The colours were very bright and vibrant.

This is a superior flat-screen monitor that is very easy to use. It is the most expensive of the CRT monitors reviewed, but professionals may find it's worth it.

**Pros** Excellent quality
**Cons** A little expensive for most people

**Contact** Chips and Bits
**Phone** (03) 9696 1911
**Online** www.viewsonic.com.au
**Price** $899

# 17in CRT monitors: specifications and results

| Product | ADI MicroScan G700i | Aurige ColorPro 17D | CTX PR711F | Hitachi CM625 |
|---|---|---|---|---|
| Contact | AKA Technology | AKA Technology | Ocean Office Automation | Hitachi Australia |
| Phone | (02) 9630 1588 | (02) 9630 1588 | 13 22 86 | (02) 9888 4100 |
| Online | www.akatech.com.au | www.akatech.com.au | www.ctxintl.com | www.hitachi.com.au |
| Price | $560 | $599 | $683 | $795 |
| **Specifications** | | | | |
| Maximum resolution (at 75Hz) | 1,600 by 1,200 | 1,600 by 1,200 | 1,600 by 1,200 | 1,600 by 1,200 |
| Dot pitch (mm) | 0.24 | 0.25 | 0.25 | 0.24 |
| Scanning frequency (horizontal/vertical) | 30 to 86KHz/50 to 150Hz | 30 to 96KHz/50 to 150Hz | 30 to 95KHz/50 to 160Hz | 31 to 95KHz/50 to 160Hz |
| Viewable area (in) | 16 | 16 | 16 | 16 |
| Dimensions: H by w by d (cm) | Not available | 40.8 by 43.5 by 42.3 | 41.5 by 44.7 by 44.7 | 40.4 by 43.1 by 44.2 |
| Weight (kg) | Not available | 21.5 | 18.8 | 16.8 |
| **Results** | | | | |
| Image sharpness | 9 | 8 | 8 | 8 |
| Colour sharpness | 9 | 9 | 8 | 8 |
| Color quality | 7 | 9 | 9 | 8 |
| Text readability | 9 | 7 | 7.5 | 7.5 |
| Brightness | 6.5 | 7 | 9 | 7 |
| Quality from a distance | 7 | 8 | 8 | 8 |
| Ease of use | 6 | 9 | 7.5 | 7.5 |

| Product | IBM E74 | Mitsubishi Diamond View DV17NF | Philips 107T | ViewSonic PF775 |
|---|---|---|---|---|
| Contact | IBM | Mitsubishi Electric Australia | Philips Electronics | Chips and Bits |
| Phone | 13 24 26 | (02) 9684 7777 | (03) 9925 3333 | (03) 9696 1911 |
| Online | www.ibm.com.au | www.mitsubishi-electric.com.au | www.philips.com.au | www.viewsonic.com.au |
| Price | $549 | $799 | $629 | $899 |
| **Specifications** | | | | |
| Maximum resolution | 1,280 by 1,024 at 69Hz | 1,600 by 1,200 at 75Hz | 1,280 by 1,024 at 61Hz | 1,600 by 1,280 at 75Hz |
| Dot pitch (mm) | 0.27 | 0.25 | 0.25 | 0.25 |
| Scanning frequency (horizontal/vertical) | 30 to 71KHz/50 to 160Hz | 30 to 95KHz/50 to 160Hz | 30 to 71KHz/50 to 160Hz | 30 to 97KHz/50 to 180Hz |
| Viewable area (in) | 15.9 | 16 | 16 | 16 |
| Dimensions: H by w by d (cm) | 41.5 by 41.2 by 42 | 42.9 by 42.8 by 44.4 | 39.9 by 41 by 41.9 | 43 by 41.7 by 45 |
| Weight (kg) | 16.5 | 19.2 | 16.5 | 20 |
| **Results** | | | | |
| Image sharpness | 9 | 8 | 8 | 8 |
| Colour sharpness | 9 | 9 | 8 | 8 |
| Color quality | 7 | 9 | 9 | 8 |
| Text readability | 9 | 7 | 7.5 | 7.5 |
| Brightness | 6.5 | 7 | 9 | 7 |
| Quality from a distance | 7 | 8 | 8 | 8 |
| Ease of use | 6 | 9 | 7.5 | 7.5 |




**Philips 107T**

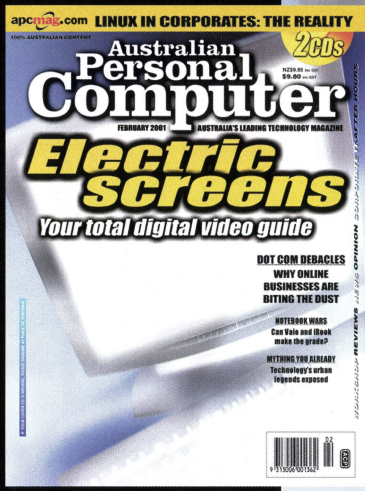
**Highly commended**
Viewsonic PR711P



It was a close contest for Editor's Choice, but the Philips 107T won with its combination of quality and value. It is an excellent monitor for home use. It looks great, has a high-quality display and high resolution, and isn't too expensive.

The ViewSonic has almost everything you could want in a monitor, but it costs as much as many 19in displays.

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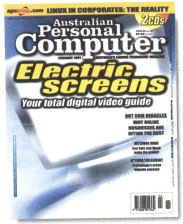
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# LCD monitors

## Hitachi CML170



A large flat-panel display, the CML170 has a 17in viewable area. It has a thinner design than the similarly sized Mitsubishi Diamond View DV170 and can be swivelled and tilted.

The monitor has display autocorrection. The onscreen display was very easy to use; it has the usual features and functions, as well as horizontal/vertical panning and zooming. The built-in speakers are adequate and there is a headphone jack for external speakers or headphones on the front of the monitor.

The display quality was basically good. Colour definition and quality were excellent, but some of the text and graphics were a little fuzzy at a resolution of 1,024 by 768. When the resolution was increased to the display's maximum of 1,280 by 1,024, the problem disappeared.

This is a very good monitor, but it will set you back a bit more than the smaller models.

**Pros** Huge display
Very easy to use
**Cons** Fuzzy text at 1,024 by 768

**Contact** Hitachi
**Phone** (02) 9888 4100
**Online** www.hitachi.com.au
**Price** $3,395

## IBM T54



The IBM T54 is the most basic flat-panel monitor reviewed and the cheapest. It features a 15.1in screen, which is typical of the monitors *APC* looked at.

The colour and text definition were good and unlike many flat panel displays, the colours didn't bleed at higher brightness levels. However, there was still some distortion when displaying fine graphics. Its performance was reasonably standard across the board, with passable colours and rather limited brightness.

The onscreen display and controls are easy to use, but the menus are basic. The unit is the only one reviewed that doesn't have built-in speakers. It would be adequate for business or home use if you favour TFT, but a maximum resolution of 1,024 by 768 and average graphics make it unsuitable for most other purposes.

*APC* recommends this model for fleet replacement.

**Pros** Low price
Large screen
**Cons** Average display capabilities

**Contact** IBM
**Phone** 1800 815 154
**Online** www.pc.ibm.com/au
**Price** $2,149

## Mitsubishi Diamond View DV170



The Diamond View DV170 is one of the larger flat-panel displays in this review. Its 17in viewable screen is huge — a little larger than the viewable area on a 21in CRT — and it can be tilted and adjusted to many angles.

The display quality was good and the colours bright, but the sharpness wasn't well defined. In some of the screens the colours banded together, especially as the colour bars got brighter. However, the contrast was very strong and showed very little misregistration.

This screen has an excellent feature for automatically adjusting the screen size to fit the required resolution without fiddling with the controls. At higher resolutions (1,280 by 1,024) the screen was very clean and clear, especially with small type.

The unit's built-in speakers were a little tinny, but passable. There are two powered USB ports on the base.

**Pros** Very large display size
Good quality
**Cons** Some colour bleeding
Tinny speakers

**Contact** Mitsubishi Electric
**Phone** (02) 9584 7777
**Online** www.mitsubishi-electric.com.au
**Price** $3,699

## Panasonic PanaFlat LC50SG



The Panasonic PanaFlat LC50SG is a 15in TFT flat panel. The unit's viewable area is comparable to the 17in CRTs in this review, and has a 140° viewing range. Most of the other products here are passive matrix LCDs, which have a smaller viewing range.

The display quality was excellent, but bright colours bled a little as they got to the brighter end of the scale. The text was clean and clear, even at a distance, and the onscreen display was one of the easiest to use of all of models reviewed. There was little to no colour misregistration, but there was a slight problem with high contrast switching. Apart from that, the brightness and contrast were very good, providing clear colours and text.

The monitor has built-in speakers, a headphone jack and the usual volume controls, as well as a useful mute button. It also has four powered USB ports, which is an extremely handy addition to the desktop.

**Pros** Great screen quality
Four USB ports
**Cons** Some colour problems

**Contact** Panasonic
**Phone** 13 26 00
**Online** www.panasonic.com.au
**Price** $2,199

## Philips 170B



The Philips 170B costs $400 more than the next most expensive flat-panel display *APC* reviewed, but it has that little bit extra to justify the price.

The 17in display was superior to any other reviewed. The colours were of very high quality and definition — the best out of all the flat-panel displays. The detail, even at lower resolutions, was solid and well defined, with no defects in the original image. There was no colour misregistration, even in the complex colour test screens. The detail levels were excellent, especially with very fine graphics and small type.

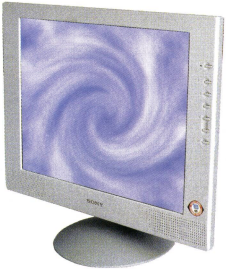
The screen was capable of vibrant brightness, even without the backlighting. It has the same onscreen display as the Philips 107T CRT, which is not one of the better onscreen displays.

This is the most expensive model reviewed here, and it is probably best suited to professionals who need a high-end LCD screen and can afford the price.

**Pros** Great contrast and detail
Excellent colour and brightness
**Cons** Expensive

**Contact** Philips Electronics
**Phone** (02) 9925 3333
**Online** www.philips.com.au
**Price** $4,099

## Sony SDM-M51



The smallest and slimmest flat-panel screen in this review, the Sony SDM-M51 has class written all over it. Its white and silver screen features a 15.1in viewable area, and is by far the smallest display in this review. The neck is adjustable at two points: where it attaches to the base and where it attaches to the back of the screen.

Like several other displays, the colours were sharp and bright, but bled as the test bars got brighter. However, text and images were extremely sharp and well defined, even from a distance. The screen handled resolution changes well and the onscreen display controls are extremely easy to work with.

The Sony is only capable of 1,024 by 768 resolution, which is less than the larger 17in models can manage, but it serves most purposes well.

At $2,419 it is a little more expensive than some other models, but its high-quality display and compact, sleek design justify the price.

**Pros** Small and stylish with large display
Onscreen controls are easy to use
**Cons** Some colour problems

**Contact** Sony
**Phone** 1800 226 429
**Online** www.sony.com.au
**Price** $2,419

## How we tested

Testing a monitor is subjective because the only way you can measure the brightness, contrast, colour and picture quality of a screen is with the human eye. To achieve the most accurate results possible, *APC* used Sonera Technologies' program DisplayMate to rate the monitors. To ensure best results and to limit discrepancies, only one person tested the monitors.

For testing, we set up a 'baseline' monitor against which all others were compared. The Mitsubishi Diamond View DV17NF was selected for this purpose because of its high picture quality. This monitor was calibrated to give the best picture possible, and then awarded a score of 8 for each result. The flat-screen displays were not tested with DisplayMate, because they are incompatible with the splitter cable.

The monitors were connected to a system with 128M of RAM and an nVidia GeForce2 MX graphics card. We used a splitter cable capable of 1,024 by 768 at 85Hz display on each connection. Each display was then compared against the baseline. Each monitor was calibrated to give the best results possible.

DisplayMate uses test patterns designed to highlight the strengths and weaknesses of each monitor.

## What we looked for

*APC* checked the monitors for quality imperfections in eight areas: moiré patterns (the wavy flickering sometimes seen on a screen); colour misregistration (when contrasting colours distort where they meet); background interference (any projections that affect the image); image focus (uniformity of the image across the display, particularly the corners); colour purity (the uniformity of colours across the screen); pincushion distortion (when the sides of the screen are warped); ghosting and streaking (images present that shouldn't be — this is usually visible with high-contrast images) and room glare (images reflected off the screen).

The monitors were given scores on a scale from 0 to 10. These scores were achieved by comparing performance in a range of characteristics (listed below) with the baseline monitor's score of 8.

- **Image sharpness** This was tested with images of varying sizes for loss of definition or fuzziness.
- **Text readability** How easily can the text be read in different sizes and colours on different backgrounds?
- **Colour sharpness** How well defined are the colours?
- **Colour quality** How true are the colours? Is there any loss of quality across the screen? Any misregistration?
- **Brightness** How bright is the display? Is the white as bright as it could be or is it dull?
- **Quality at a distance** What is the display definition like at a distance?
- **Ease of use** How simple is it to set up? Are the controls and onscreen display easy to use?

EDITOR'S CHOICE
Australian Personal Computer

### Sony SDM-M51

**Highly commended**

Mitsubishi Diamond View DV170

The Sony stood out for all the reasons people turn to LCD screens in the first place — it's small, light, very thin and has great display properties. It only has a 15.1in viewable area, which is a lot smaller than the 17in Mitsubishi, but it is much cheaper.



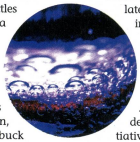
The Mitsubishi Diamond View DV170 has an excellent display and costs $400 less than the other 17in LCD screen, the Hitachi CML170.

## 17in LCD monitors: specifications and results

| Product | Hitachi CML170 | IBM G94 | Mitsubishi Diamond View DV170 | Panasonic PanaFlat LC50SG | Philips 107T | Sony SDM-M51 |
|---|---|---|---|---|---|---|
| Contact | Hitachi Australia | IBM | Mitsubishi Electric Australia | Panasonic | Philips Electronics | Sony |
| Phone | (02) 9888 4100 | 13 24 26 | (02) 9684 7777 | 13 26 00 | (03) 9925 3333 | 1800 226 429 |
| Online | www.hitachi.com.au | www.ibm.com.au | www.mitsubishi-electric.com.au | www.panasonic.com.au | www.philips.com.au | www.sony.com.au |
| Price | $3,395 | $2,149 | $3,699 | $2,199 | $4,099 | $2,419 |
| Specifications | | | | | | |
| Maximum resolution (at 75Hz) | 1,280 by 1,024 | 1,024 by 768 | 1,280 by 1,024 | 1,024 by 768 | 1,280 by 1,024 | 1,024 by 768 |
| Dot pitch (mm) | 0.264 | 0.297 | 0.264 | 0.297 | 0.264 | 0.3 |
| Scanning frequency (horizontal/vertical) | 24 to 80kHz/56 to 85Hz | 30 to 61kHz/50 to 77Hz | 31.5 to 81.2kHz/56.3 to 76.2Hz | 30 to 61kHz/50 to 77Hz | 56 to 76kHz/30 to 82Hz | 28 to 64kHz/48 to 75Hz |
| Viewable area (in) | 17 | 15 | 17 | 15 | 17 | 15in |
| Dimensions H by w by d (cm) | 43.6 by 42.4 by 17.8 | 37.1 by 40.1 by 20.2 | 45.1 by 42.2 by 20.8 | 39.1 by 38.5 by 20 | 47.1 by 44.6 by 18.1 | 38.7 by 34.5 by 18 |
| Weight (kg) | 6.5 | 6.5 | 7.7 | 7.1 | 16.5 | 4.6 |

# Java still boiling

When Java was announced in late 1995, it attracted massive coverage and enormous amounts of hype. Five years later, the casual observer might conclude that the hype was misplaced. The failure of the network computer concept undoubtedly knocked some of the wind out of Java's sails, as did the battles over who would control the Java standardisation process.



In the financial results it released in January, Sun made almost no mention of Java as part of its vision for 2001. Instead, it focused on its hugely profitable server division, which helped the company buck industry trends and turn in a $US1 billion profit over the half year. However, it would be a mistake to interpret this as a rejection of Java by Sun.

For the average Web surfer, Java may appear irrelevant in 2001. Within the enterprise market — where interoperability is a real concern and not merely a convenient buzzword — Java has proved its worth. The introduction of version 1.2 of the Java 2 Platform Enterprise Edition (J2EE) has won backing from key corporate vendors, including Borland and Sybase, and Sun claims J2EE is in use in 90% of the corporate application server market. Version 1.3, due later this year, is said to include improved support for XML, asynchronous messaging features and enhanced connector technologies for legacy systems.

A parallel can be drawn between Java and Microsoft's .NET strategy, examined in detail in this issue. The .NET initiative is at the stage where Java was four years ago; widely discussed and evangelised, but yet to make a real impact. Java may not dominate the world, but it has established itself as a key element in enterprise infrastructures. Having seen soft sales of Windows 2000, Microsoft will be hoping that .NET can achieve a similar take-up in the long term.

## This month's buzzword: VRM



### Why do we need this term?

Customer relationship management, or CRM, was a widely promoted trend in 1999 and 2000. All it meant was providing decent customer service. Obvious or not, it caught the enterprise eye. Research by Gartner Group suggests that the average spending on CRM technologies by business is over $US1 million per year, and the CRM services market is expected to peak at just under $US20 billion for 2000. VRM is a spin-off term.

### What does it mean?

VRM has long been understood to mean 'voltage regulator module' among the processor cognoscenti, but clearly no-one in the know was around when the latest usage was coined. VRM is now being used to stand for 'visitor relationship management', a catch-all term for recording the activities of visitors to a corporate Web site to better understand their potential audience. This can encompass anything from the simple tracking of site visits to logins and detailed profiles for each user. This is hardly a new activity, but VRM provides a new branding for it.

The term has been trademarked by Web data analysis software company WebTrends, but that hasn't stopped consultants from jumping on it with the usual lack of discrimination and purpose. WebTrends defines the term as "providing businesses with a framework to optimise Web site visitor interactions and experiences, building relationships to turn visitors into loyal customers". (By the by, WebTrends announced a merger with fellow analysis software company NetIQ in January.)

Of course, collecting personal data raises privacy issues that could land you in legal hot water if you ignore them.

### When should I use it?

Any discussion of online business inevitably hinges on the failure of many dot com models, so a passing reference to VRM can make you look more informed than you actually are. Try: "A critical but unacknowledged factor in the collapse of many ebusinesses has been a failure to address VRM in a systematic fashion."

## Contents

**This month in Corporate IT**

**Outsourcing**
Does the recent report into government IT outsourcing have implications for all businesses? 104



**Casting a wide .NET**
Microsoft's Brad Adams talks about where the .NET initiative is heading. 107



**The business of IT education**
Business is using the current skills shortage as an opportunity to become more involved in IT education. 112



## Patch Panel

The Patch Panel section on CD 1 of *APC*'s cover CD pack includes the latest patches and updates for a wide range of operating systems and applications. Check page 12 for details.




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# Outsourcing for the goose

*Should the recent damning report into IT outsourcing by the Commonwealth Government sound a warning bell for all businesses?* ***Angus Kidman*** *investigates.*

Outsourcing is the practice of giving business functions such as information technology to a third party under a managed contract. It is not normally the subject of headlines in tabloid news bulletins or discussion on talkback radio. However, the topic of IT outsourcing by the Federal Government scored on both counts in early January; it even threatened briefly to become a major election issue.

The catalyst for this unusual state of affairs was the release of an independent report on the success of the government's $5 billion IT outsourcing initiative, begun in 1997 at the behest of finance minister John Fahey. The report by ASX managing director Richard Humphry was strongly critical of the initiative, attacked the government agency placed in charge of the project, and recommended immediate and drastic changes to current practices.

Humphry's investigation followed an equally damning report on the government's IT outsourcing plans by the Attorney-General last year. That report concluded that the budgets of many departments had been cut as a result of the $1.2 billion spent so far on outsourcing, and raised questions over $17 million in consultancy payments to US law firm Shaw Pittman.

A continuing Senate investigation into the success of outsourcing to date may also highlight further areas of concern, with the Opposition already crowing over the government's refusal to answer questions relating to Shaw Pittman's appointment as strategic advisors. (The law firm has since been dismissed from that role.)

The ongoing dispute over outsourcing is centred on government policy issues that wouldn't necessarily apply to the private sector. However, businesses considering outsourcing as a solution to their technology troubles now need to seriously ask themselves whether the benefits outweigh the risks. The answer? They possibly do, but it depends very much on the way you approach the problem.

## Humphry laid bare

"If properly applied, IT outsourcing can lead to substantial benefits," Humphry wrote in the introduction to the report. "However, significant difficulties have been experienced in the implementation process by many agencies that have completed contracts and substantial risks have been identified with respect to the groups yet to be outsourced that now need careful consideration."

Humphry concluded that many of these issues were due to an over-zealous emphasis on technology itself, at the expense of considering its role in actually acheiving things. "IT outsourcing is, at its heart, about the management of human resources and cultural change, of which technology is an important, but not dominant, element," he wrote.



In the rush to implement outsourcing, issues such as privacy and future shifts in direction also received short shrift. "Priority has been given to executing outsourced contracts without adequate regard to the highly sensitive risks and complex processes of transition and the ongoing management of the outsourced business arrangement," the report found.

## Asset or burden?

Humphry was particularly critical of the Office of Asset Sales and IT Outsourcing (OASITO), which was responsible (along with its parent agency, the Department of Finance) for implementing the outsourcing program. "Although OASITO has been an important and necessary catalyst for change and moving the initiative from a point of inertia to realisation, it is no longer appropriate for them to continue with their centrally managed role," he wrote. "There has been a lack of focus on the managerial and operational aspects of implementation by OASITO, for the sake of settling legal and contractual arrangements according to an ambitious timetable. Similarly, there have been concerns that some agencies lacked sufficient inhouse expertise to manage transitional arrangements."

In its response, the government tried to underplay this finding, arguing vigorously that outsourcing would never have been accepted into the public service culture without a central co-ordinating agency. However, the government's acceptance that responsibility for outsourcing objectives should now be returned to departmental heads represents a major shift in its approach. (OASITO will be available to act in a consulting role to assist with this task for six months, but only if the agency in question requests it.)

Humphry recommended 10 changes to minimise the risks associated with IT outsourcing. Most were accepted by the government, but some were modified in the process. For instance, while Humphry argued that responsibility for outsourcing should be fully devolved to department heads, the Department of Communications, Information Technology and the Arts is set to continue in its role of monitoring local industry involvement in individual outsourcing projects.

Similarly, Humphry argued that there was no obvious benefit in the current

Illustration by Christopher Nielsen

'group' approach to outsourcing, in which multiple agencies collectively tendered IT requirements. Humphry said this approach should be abandoned once group tenders expired, but the Department of Finance predicted that "agencies will more than likely continue to seek economies of scale through groups at their own discretion." Humphry told a different story: "A single contract for an entire group appears to be unnecessary and allows agencies less flexibility in managing their relationship with their ESP. Indeed, in the course of implementation, later clusters of agencies have not always used a single, common contract and this is a sensible and worthwhile evolution."

The following recommendations were accepted more or less unchallenged.

- Allowing agencies to choose their own outsourcing model, in line with individual requirements.
- Creating a separate 'fee for service' body which will provide expertise in IT outsourcing if required (this is set to be established within the Finance Department).
- Allowing Centrelink and the Department of Family and Community Services to manage their own outsourcing projects, and assessing carefully whether the benefits of outsourcing outweigh the risk of sensitive information being exposed. "The outsourcing process for Centrelink should not proceed until the Centrelink board is satisfied that the transition and implementation risks can be effectively managed," Humphry wrote.
- Reassessing currently active tenders in Groups 1, 10 and 11 for risk before proceeding.

## Hitting the fan

Several government departments have already made public their desire to avoid outsourcing altogether, with the CSIRO and Centrelink among those reported to be fighting hard to maintain control of their own systems. The National Library and the Department of the Treasury have already withdrawn from the active Group 11 tender, but this does not preclude them from being added to a later round of outsourcing.

It has also been suggested that outsourcing of other functions such as property management and human resources across government departments may be delayed by Humphry's scathing report. However, Fahey has gone on record as saying that OASITO will be involved in helping formulate plans for outsourcing in these areas. Whether these follow the decentralised process advocated by Humphry remains to be seen.

The ongoing scandal has also drawn attention to other areas where government IT contracts have been mishandled. Complaints have arisen about the awarding of a Customs tender where information about a current system was given to technology giant EDS, allowing it to win the contract and threatening the continuation of two local companies involved in the business. Private sector outsourcing deals are unlikely to be subject to the same level of scrutiny, but such problems highlight the importance of having well-established criteria before embarking on any tendering activity.

## Lessons in offloading

The central lesson from the government's IT outsourcing woes is that it is vital to have a clearly established vision of the benefits of outsourcing and not merely assume that it will automatically produce savings when applied across the board. Change for change's sake is rarely a successful argument; you must be able to demonstrate the benefits of change clearly, and ensure that those benefits are actually realised. This requires consultation with business divisions to create a functional and effective plan.

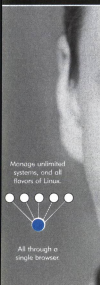
Several government departments have argued that partial outsourcing of IT functions, rather than the blanket 'dump everything' approach mandated by Fahey, would have produced more positive results. A partial outsourcing arrangement might, for example, see routine systems such as email contracted out to a third party, but leave customised business applications inhouse, since these rely heavily on critical internal knowledge for their effectiveness.

A second variation on this approach is to limit outsourcing to particular divisions within the company, even if some functions (such as email) naturally overlap. This will tend to limit cost savings, but concerns over issues such as privacy — a key consideration for organisations such as Centrelink, which handles large amounts of confidential information — need to be factored into this equation.

It's also essential to track the actual savings that result from an outsourcing project. Savings should not be factored into ongoing budgets until it's clear that those savings are going to be achieved. At the very least, management should be prepared to inject additional funds into a division or company if it becomes clear that outsourcing is not delivering on its promise.

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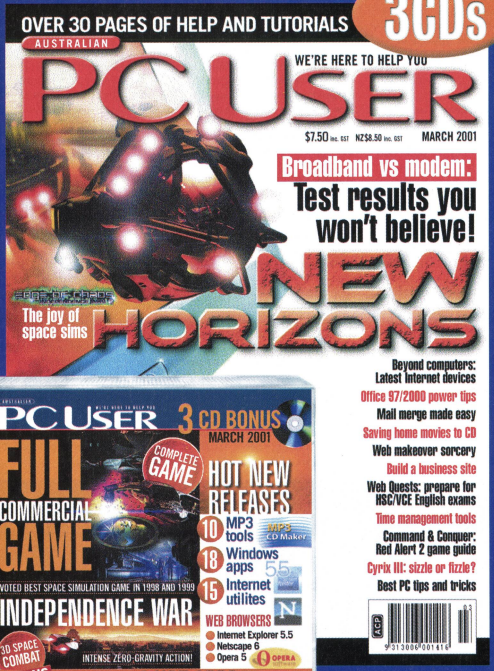
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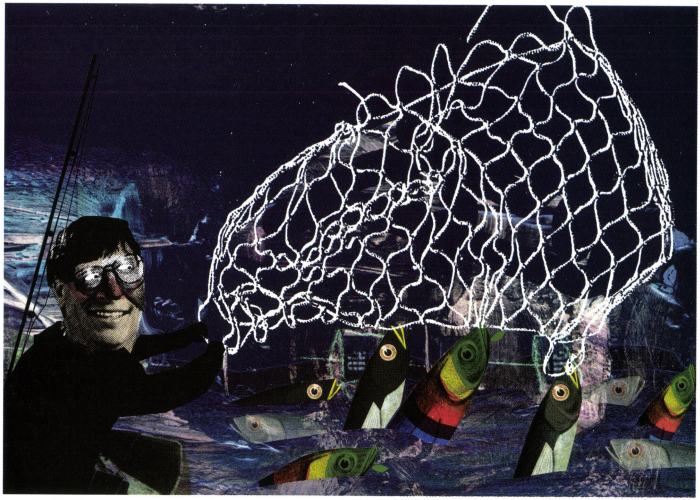
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# Casting a wide .NET

*Microsoft has moved away from Java and set about converting developers and businesses to its new Web application development platform.* ***David Braue*** *spoke to Microsoft's Brad Abrams about where the .NET initiative is heading.*



The bunfight between Microsoft, Sun Microsystems and the rest of the software development world over Microsoft's less-than-orthodox implementation of the Java development language has dragged on for years. Things looked like they would settle down following a November 1998 court decision in Sun's favour that forced Microsoft to scale back plans to more closely integrate Windows with Java. Microsoft now hopes to put the Java drama behind it by taking the industry in a completely new direction.

That new direction is the company's .NET initiative, which Bill Gates announced with much fanfare last year. A lack of .NET products has led many to dismiss it all as hot air, but the solid reviews the first .NET product, MSN Explorer, may change this.

Microsoft reached a major milestone at Comdex last November with the first beta release of its new Visual Studio.NET (see review on page 24). This is a comprehensive development suite providing a consistent back-end application environment that supports a range of programming languages including C++, Visual Basic and Microsoft's new C# ('C sharp'). The beta is available from msdn.microsoft.com/vstudio, and the final version is expected in the second half of this year.

Industry response to C# will not be clear until the environment matures, but Microsoft is pushing C# through the ECMA (European Computer Manufacturers' Association) standards organisation in an attempt to gather popular support. The presence of C# in Visual Studio.NET highlights the absence of Java, which has been a thorn in Microsoft's side ever since it was sued by Sun in 1997 for polluting Java in its J++ development tool.



J++ is not included in Visual Studio.NET; Microsoft is relying on third parties to develop interfaces for Java and other development languages instead. These interfaces will slot into Visual Studio .NET's core common language runtime (CLR), which allows developers to use the languages they're comfortable with to build applications that access the same core back-end functionality and operating system integration.

This is a bold move, considering that the rest of the development world has rapidly warmed to Java, and that its most recent incarnation is helping push Java ever deeper into the enterprise market. It also leaves developers in a bit of a quandary. The popularity of Microsoft's development tools makes Visual Studio.NET a natural upgrade, but leaves them without integrated Java support, and under pressure to learn C# and begin implementing applications in the new language.

This could hobble the takeup of Visual Studio.NET in corporate environments, particularly as many companies have already made a substantial investment in Java and related development tools. However, Microsoft is unfazed by this. It argues (naturally) that its .NET initiative, combined with the growing popularity of Windows 2000, lays the groundwork for online applications in the future.

Microsoft's move away from Java can be seen as a retaliation against Sun's long-running hostility, but it also emphasises the growing belief that online applications will increasingly operate independently of the Web as we know it. Forrester Research chairperson and CEO George Colony recently declared the Web dead, saying that what he calls the executable Internet (or X Internet) will rapidly take its place and convert the Internet into a new form of widely distributed client/server.

Microsoft is helping bring about this shift with its Visual Studio.NET strategy. The growing support of industry analysts means the approach may not be as far-fetched as sceptics have suggested.



## "There are some real problems we're trying to address. One is DLL hell."

To find out more about how Microsoft is building the development tools that will make or break the success of its .NET initiative, *APC* spoke with Brad Abrams, Microsoft's lead program manager for .NET Frameworks. Abrams has spent three years bringing .NET from the concept stage to the delivery of Visual Studio.NET, and continues to help shape the tool set as the overall .NET initiative gains momentum.

**APC:** *Why should an enterprise developer get excited about the work you're doing with the .NET Framework and tools like Visual Studio.NET?*

**Abrams:** Microsoft believes that a programming language should be the developer's choice, and you should be able to use whatever suits your problem domain best. A lot of programming shops have some people writing C++, some writing Visual Basic, some writing in other languages. The .NET Framework is a common environment for multiple programming languages, and it gives you the ability to create solutions that make good use of this multiple language infrastructure.

**APC:** *What was the thinking behind the introduction of C#?*

**Abrams:** There's some doubt about the industry's ability to use Java and bring Java forward, so there's a need for an open standard language, and that's why we've evolved the C++ product into C#. We have millions of lines of code written on it, and it's been widely reviewed. In conjunction with partners such as Intel and Hewlett-Packard, we have submitted C# and the CLR to ECMA.

**APC:***What benefits does it actually deliver?*

**Abrams:** We started from C++ and took away those things that were redundant or confusing, but we kept properties that were powerful. C# is very object oriented; the components are almost an application of object-oriented technology. It fully supports inheritance, and in our model a component is a type that can reference other types.

My personal opinion is that the thing that made Visual Basic so successful was customers writing ActiveX controls for VB, and now that's available on the server. It's in the spirit of ASP (Active Server Pages), but is a complete re-architecture; suddenly, all the benefits you had with VB for building client-side apps — such as a drag-and-drop model, control model, rich access to data and opportunities to build third-party controls — you now have on the server. You also get Internet scaling, support for wireless stuff and smaller display devices, and these apps will be easier to write.

**APC:** *And, of course, it ties in even more closely with Windows.*

**Abrams:** There are some real problems we're trying to address. One is DLL hell. If you have multiple shared components and install a new app which overwrites a shared DLL, it can break an installed

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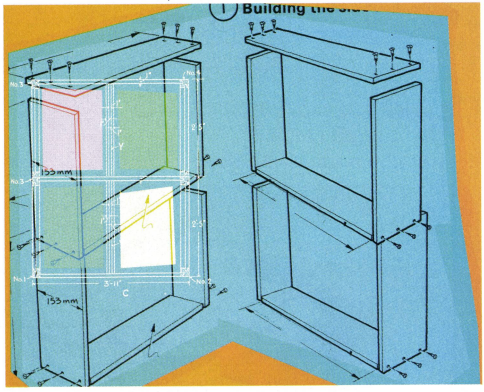
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app. Some nice recovery from that has been produced, as well as some protection with system protected components. With the .NET Framework, apps bind exactly to a particular DLL version, and multiple versions can be run side by side. This means different apps can use different versions of the same shared component.

The server-side programming model will also be an advantage, because the .NET Framework supports the running of code in a semi-untrusted way. If I download code from FlyByNight.com, I might not want that code to run with as much trust as other code I run on my machine, and I might want to limit the things it can do. In an enterprise situation, the network administrator should be able to set up a policy.

If the enterprise has partner companies with rich apps that should be able to run from the Net, they can trust those companies. Within our model, the network administrator can do that. Also, the developer writing the app should be able to write it in such a way that even if the end user is running in a low-trust or semi-trust context, they can still do something interesting.




**APC:** *Why did Microsoft choose not to support Java in Visual Studio.NET?*
**Abrams:** We've had the J++ tool, but as you're probably aware there is some doubt in the industry about our ability to innovate in the Java space. As long as that doubt is there about what we're allowed to do, Microsoft doesn't have plans to support Java. We saw that there is a need for the industry to be able to extend the environment, and that's what we're doing. We're already very far along the standards track with C# and have a number of companies supporting it.



"We believe we are going to build the best tools for programmers to build applications."

**APC:** *So you'll leave Sun to write a Java extension for the CLR?*
**Abrams:** Third-party languages such as Cobol, Perl, Python and Delphi can be added, but I'm not aware of any plans to do this yet. I think a lot of these major vendors will be looking at where their customers are. It's not that difficult to do, but of course the more complex the language, the harder it is.

Developers in a number of academic languages, many from Australia such as Mercury, Component Pascal, Eiffel and Scheme, are doing language research, and targeting the .NET Framework as the environment for those languages to run in. We've written a great debugger they can use, and a large set of class libraries they can write something interesting in. This means they can focus on some language aspects, but still build cool applications because they can use all the work Microsoft and third parties have done.

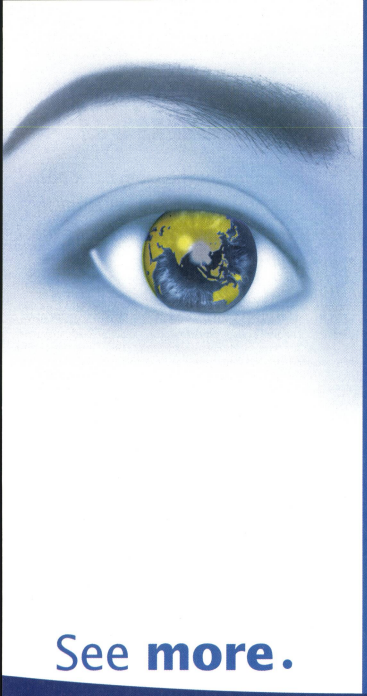
**APC:** *One of the advantages of Java is its support across a wide range of platforms. Will the .NET Framework cater for Unix and other non-Windows environments?*
**Abrams:** Microsoft is committed to shipping it, and the beta has shipped on the Windows 95/98, NT and 2000 platforms. It will also work on future OSes that come out of Microsoft, and we expect the .NET Framework to become available on these platforms. Microsoft will also provide the .NET Compact Framework, which will target Windows CE and devices below there.

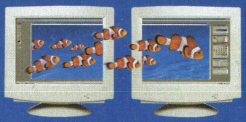
On the other side, we're turning over the complete specifications for the CLR to the ECMA group. There are certainly a lot of partners in there that support other operating systems. We've had COM (Component Object Model) working on Unix in the past, and I would not be surprised to see them make this work on other platforms.

**APC:** *Like Linux?*
**Abrams:** I don't have any knowledge of that. I think you'll see something very soon as the industry recognises the degree of openness Microsoft is providing with this infrastructure.

**APC:** *Many will dismiss this as just another case of Microsoft going against the world.*
**Abrams:** Especially with the common language runtime, Microsoft is embracing Internet standards and practices. One of the core pillars of our platform with Web services is to build on standards that are already out there or are emerging in the industry. In the end, it will be open, because Web services are based on SOAP (Simple Object Access Protocol), a specification we worked on with IBM that is already published on the Web.

It's sort of a risk for Microsoft to build on these standards, because they can operate in any environment, but it's a recognition of the way developers are building these days. In a lot of ways this is an evolution and not a revolution. If you go deeper, you find details about how the common language runtime is built that are very novel. We believe we're going to build the best tools for programmers to build applications.





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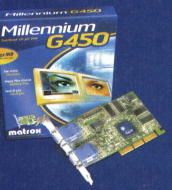
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# The business of IT education

*The IT skills shortage is causing serious difficulties for businesses, but it has proven to be a good thing for the current crop of IT graduates from Australian tertiary institutions. Universities are working with IT companies to produce the skilled professionals the industry needs.*

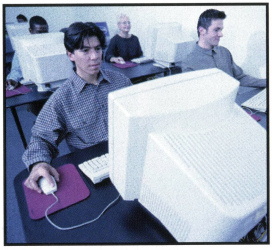
IT businesses are desperate to snare the best graduates from university computing faculties. Consequently, major companies are becoming more involved in the nation's tertiary institutions than ever before. This is leading to a richer university experience for IT students and immediate access to the best of these students for IT companies.

According to Australian Information Industry Association (AIIA) education officer Michel Hedley, the AIIA has been encouraging companies to get involved in universities for some time "because it helps turn out better-qualified students". He said that in the US, companies are very involved in tertiary education, providing guest lecturers, work placements and scholarships among other things. However, there's still a long way to go in Australia. "I'm not being negative about that," he said. "There is a surprisingly high degree of interaction between companies and universities. But there is always room for more of that."

The initiatives mentioned above obviously benefit students, but there are also advantages for lecturers. According to Judy Kay, associate professor in computer science at the University of Sydney, some IT companies provide funds for a Chair — money that goes toward hiring university professors. Two companies involved with the University of Sydney are Sybase and Cisco. As well as funding university professors, they have undertaken research projects and collaborative work with them.

Australian universities have also adopted the strategy of collaborating with IT companies to house research and development facilities. In late December, universities including the University of New South Wales, the University of Sydney and the University of Wollongong entered into an agreement to develop a Cooperative Research Centre (CRC) with IT companies including Nortel, Hewlett-Packard and Motorola.

CRCs are a government-sponsored initiative to get industry and universities to work together on projects. Theoretically, once the projects are under way, CRCs become self-sustaining and don't require ongoing public funding. One CRC already running involves the University of Technology, Sydney (UTS) and the University of Queensland. Both universities are conducting research in the field of distributed systems technology. The CRC is principally oriented towards the computer engineering faculties.



Similarly, late last year UTS announced a deal with telco equipment supplier Alcatel. The two parties have agreed to collaborate to develop software at the university. The company will also sponsor student positions in the software engineering faculty.

Nortel Networks' association with the University of Wollongong is on a much larger scale. In June 1999, Nortel announced it would invest $150 million over five years into R&D in Australia. This included the establishment of a wireless research and development facility at the University of Wollongong. The lab allows lecturers and students to work directly with industry, and in this case, to work on the development of wireless interconnect products in conjunction with carriers including Optus and Telstra.

Building labs and research centres incurs heavy costs. The IT industry is also getting involved with universities in less expensive ways. UTS is a Cisco Academy, which means it incorporates Cisco material into its curriculum. This allows Masters of Internetworking students to undertake coursework to independently sit for a Cisco Certified Networking Associate test. UTS has similar arrangements with IBM and Microsoft, among others.

However, according to UTS associate dean of education David Wilson, whatever path the university takes "has to be a win-win" situation for the students, university and industry. Wilson said UTS is "quite willing to talk" to industry to improve the courses it offers and had a long history of doing so.

For this dialogue to happen, universities need good communication with the outside world. UTS has long had an advisory committee with industry links, a legacy of its beginnings as an institute before becoming a university in the 1980s. When it was an institute, UTS was required to obtain industry advice when preparing its courses. The advisory committee still comments on the relevance of courses, identifying new areas as well as those that are no longer significant. Wilson believes the advisory committee is critical. "It allows us to keep our finger on the pulse and provides confirmation on the direction we are going in," he said. According to Wilson, the advisory council is a "newer concept" in some of the other Australian universities.

In light of Australia's IT skills shortage, increasing cooperation between universities, industry and the government is likely. Although graduate numbers are falling short of Australia's current needs, the IT professionals local universities are producing are increasingly well equipped for the IT industry.

***Francesco Lopez***

# Got five minutes?

This month, Workshop kicks off a new section called 5 Minute Guides. It's devoted to explaining technology in a simple question-and-answer format. Each month it will cover one basic topic and one advanced topic. The series starts by examining key points related to software patches and wireless networking standards. Email us with your suggestions for topics at workshop@acptech.net.



There's more good news for Workshop readers: the discussion section is back online at **apcmag.com**. The operating system discussions were particularly popular with readers who wanted to exchange tips and ask questions. The new discussion forum has an improved format and there are categories for all sections of the magazine. It's a great place to have your say and interact with the magazine's writers and other *APC* readers.

Once again, Workshop brings you all kinds of useful tips and information. Step by Step helps you save space on your hard drive with some clever ideas that you probably haven't come across before.

The Windows column conveys the essential facts about your system's registry. Cleaning up the registry can improve system performance, but take care. You should only attempt this if you are really sure that you know what you're doing; mistakes could result in your system becoming unstable.

Linux fans may like to check out Bibliofile this month, as it features reviews of three Linux books. The regular Linux column explains how to use the cmp and diff utilities to compare two files.

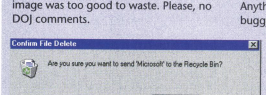
Have you ever been curious about how recursion works? This month's Java column explains how to use recursion as a problem-solving tool.

We hope you find plenty in Workshop to save you time and help you learn about the topics that interest you most. The complete contents of this month's Workshop are listed in the box on the right.

**Workshop is a reader-input section. Please send your ideas, comments or criticisms to workshop@acptech.net, or to our snail mail address APC Workshop, PO Box 4088, Sydney NSW 1028.**

## Bug of the month

OK, we admit it. This isn't a bug. However, when bugmeister John Craick tried to delete a file called 'Microsoft', the image was too good to waste. Please, no DOJ comments.






That function poorly, or things that crash a particular application. Anything and everything buggy deserves mention.

Send us your favourite bug via email to bugs@acptech.net or snail mail to APC Bug of the Month, PO Box 4088, Sydney NSW 1028, and you'll be in the running to win a software prize. Please send screen captures, example code listings or detailed instructions to trigger a bug in an application, as appropriate for your entry.

The winner's name, along with details of the bug, will appear in this column in *APC* May. So start hunting!

*Michael Smith*

## Win! Win! Win!

Workshop is always on the lookout for the most interesting, strange, funny or downright weird software bugs you can find. These include code snippets, features

## Contents

**This month in Workshop**

Our new **5 Minute Guides** look at software patches and wireless networking standards. 114

In **Bibliofile**, you'll find reviews of books on Linux, the Web, Microsoft Windows Media Player 7 and ecommerce. 120

Does it feel like you never have enough hard disk space? **Step by Step** reveals some little-known tips to maximise your hard drive. 121

Find out how to edit and clean up your system's registry in **Windows**. 124

Our **Linux** column shows you how to compare files using two handy command-line utilities. 126

Find out how to use your mobile phone to connect your Pocket PC to the Web in **PDAs**. 130

**Mac OS** helps you give your Mac a new look using the Appearance control panel. 132

While it's on a roll, **Practical C++** builds on last month's dice game. 136

Learn how to solve some of your programming problems using recursion in **Practical Java**. 138

**Insite** shows you how to use the PHP scripting language to make your Web site more dynamic. 142

*5 Minute Guides examines the dos and don'ts of installing software patches.*

# Patch work

## Why don't they get it right the first time?

As time goes by, manufacturers improve software by adding new features and resolving problems such as security flaws. Sometimes these improvements appear as new versions that you can buy, but often they are implemented as an update file or 'patch' that you can install. Nowadays, patches are usually made available for download over the Internet. You transfer them to your PC and follow the installation instructions.

or Tucows, where the latest downloads from around the Internet are collected, rated and made available for download.

Some applications, particularly those designed to be used with the Internet, come with internal update facilities which automatically check the manufacturer's Internet site for new versions and download them if required.

If you don't like downloading patches over the Internet, ask the manufacturer to send the patch to you on a floppy disk or CD-ROM. You can also find important new patches on *APC*'s cover CDs.

## Welcome to 5 Minute Guides

5 Minute Guides is a new regular column in Workshop explaining how technology works in question-and-answer format. Each month we'll run a Five Minute Guide on a basic topic and another on an advanced topic. If there's something you'd like to see covered, let us know via email at workshop@acptech.net.

## What if I don't install patches?

Sometimes it's best to ignore patches. Software companies often make new mistakes when they fix old ones, so upgrading is not always sensible until you hear from others that the patch is reliable. However, patches are sometimes vital, especially where they fix bugs that might otherwise prevent effective use of the software. An update to a virus scanner is probably more important than a new feature added to a game. It's up to you to assess each patch's importance.

Usually you can continue using your software without upgrading. Exceptions to this are programs that rely on access to a central server. You generally need to run the same version as the server, or a new version that is backward compatible. Many people run the original version for many years, blissfully unaware of any new features or bug fixes. Others like to scour the Internet for new releases and become de facto beta testers for the latest patches.



## Where can I find patches?

The most obvious place to find the latest version of your software is the manufacturer's Web site. The address is usually written somewhere on the software packaging. If not, try entering www.manufacturer's name.com.

However, if you own a lot of software this can be very time consuming. It is often better to visit a site like CNet's download.com

## What is Windows Update?

Microsoft has a Web site called Windows Update which caters to users of its Windows operating system. Security patches and new versions of Windows components are available on it. You can find Windows Update in the Start menu.

There are usually more updates available on Windows Update than you could possibly download. Some are quite time consuming to download through a modem. However, they're sorted into categories of importance, so you can quickly assess what you want.

To access Windows Update you now need to have Microsoft Internet Explorer. It's also one of the products available on the site.

## What are drivers and do they need patches?

Drivers are component-specific software instructions for the hardware in your PC. Your operating system is probably running a video card driver and a soundcard driver so you can see graphics and hear audio. Default drivers are built into most operating systems, or are included on CD when you buy a new component.

Most manufacturers issue regular driver updates and it's important to download them if you want to get the best performance from your hardware. If you run multimedia and games on Windows, you should also install the latest version of DirectX, a Windows add-on used by multimedia drivers to process information more efficiently.

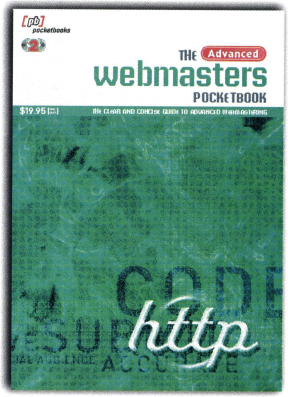
## Are there any tips for successful patching?

If you download a lot of patches, arrange them in a folder on your hard drive and make a backup, so you can easily find them again if you need to reinstall the operating system. When you download a patch, use an FTP (file transfer protocol) client that can resume an interrupted download. That way, you won't have to restart if the modem hangs up. Windows Update does not support this feature. It takes the risk of transferring large files through HTTP (hypertext transfer protocol) instead.

***Simon Vandore***

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*Wireless networking standards will play a critical role in Internet access in the near future.*

# Standardising a world without wires

## What are these 802.1 standards I'm reading about?

The 802.1 family of standards was developed by the Institute of Electrical and Electronics Engineers (IEEE), which has been responsible for helping develop many key standards such as Ethernet for corporate networks. These standards allow PCs and other electronic equipment to be interoperable. The IEEE has more than 340,000 members in 150 countries, so it has a much better chance of developing open standards than individual companies (although the IEEE sometimes draws on such work). With interest in wireless networking technologies continuing to grow, the IEEE's wireless initiatives are attracting a lot of attention.

## What do all the different numbers mean?

There are three main wireless working groups within the IEEE. Each focuses on a different series of standards that cover aspects of wireless technology. Each standard (or more accurately, group of standards) produced by the IEEE is identified by a number. The 802.1 'family' covers wireless networking.

Probably the best known is the 802.11 group, which works on standards for wireless local area networks (LANs). The IEEE describes the 802.11 standard as comparable to the IEEE 802.3 standard for Ethernet for wired LANs. Standards developed by the 802.11 group were first ratified in November 1999, and now underlie many of the commercially available products for small or home office networks. For example, they're used in the AirPort range of equipment included with all new Macs. The 802.11 standards cover direct interaction between wireless devices, and between base stations and the machines connected to them.

The 802.15 group is likely to receive increased attention in the coming months as more manufacturers introduce domestic wireless products. The 802.15 group focuses on wireless personal area networks, which are designed to consume lower amounts of power and be less complex to administer than those using 802.11. This will be a highly competitive segment of the market.

The third wireless working group focuses on the 802.16, examining standards for broadband wireless initiatives. Very few formal standards have been proposed by the group so far, which perhaps reflects the relatively slow uptake of broadband systems (wireless or otherwise) in many markets. However, a number of standards initiatives by the 802.16 group are expected to reach fruition in the next few months.



## How does this relate to Bluetooth, HomeRF and other wireless standards?

Bluetooth is a specification for building and interconnecting low-cost wireless devices in homes and offices. It was spearheaded by nine major IT and communications companies (3Com, Ericsson, IBM, Intel, Lucent, Microsoft, Motorola, Nokia and Toshiba). With so many high-powered backers, Bluetooth (which has more than 2,000 members in its associated special interest group) has received a lot of publicity, even though the first products are only just hitting the market.

HomeRF has a narrower focus, aiming exclusively at simple systems for interconnecting conventional PCs in the home. It was developed using a similar structure to Bluetooth, with six promoter companies (Compaq, Intel, Motorola, National Semiconductor, Proxim and Siemens) and support from about 75 more. Backers of the standard claim it has a dominant share of the market, but as Bluetooth and 802.11 products become more widespread, its limited usefulness in enterprise environments may see that share drop .

Bluetooth and HomeRF are driven by commercial considerations and don't involve the same degree of formal ratification as IEEE standards. This situation is often referred to as de facto standardisation, where standards are imposed by market forces rather than consensus. This makes them riskier to adopt, but it means they're commercialised more quickly.

The relationship between these standards and the IEEE is complex. The 802.15 group has openly acknowledged the importance of Bluetooth, and wants to develop interoperability between the two specifications. However, as Bluetooth devices have the potential to interfere with the signals transmitted by devices using 802.11 and 802.15 standards, it's not yet clear whether they'll be able to coexist. Backers of HomeRF have been involved in similar battles over potential frequency interference between HomeRF products and other devices.

## What's the practical use of all this stuff?

Regardless of which standards ultimately prevail, wireless equipment will play an increasingly important role in technology. As well as replacing traditional cabled networks in offices with wireless networking cards connecting to base stations, wireless systems could be used for everything from authenticating passengers on flights to allowing interactive gaming between children in different rooms in the same house.

Wireless networking equipment is also being trialled by ISPs that provide access to suitably equipped PCs within a defined (and usually quite small) area. One issue with these systems is pricing; as anyone within range of a base station can connect up, policing traffic may be difficult. Security is also an issue, but encryption will play an important role here.

***Angus Kidman***

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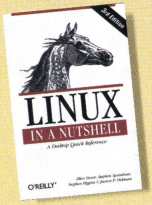
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# A plethora of penguins

## Linux in a Nutshell

The third edition of *Linux in a Nutshell* claims to be a complete command reference for programming, administration, user and networking commands. It contains what appears to be all common, nondistribution-specific Linux commands (a hefty 400 pages out of a total of 800). These are listed alphabetically with complete switch lists and descriptions. The book also contains a networking and administration overview, guides on using the Red Hat package and Debian package managers, and detailed explorations of the bash, csh and tcsh command shells. There's a useful section on the pattern matching features of shells, a detailed look at the Emacs, vi and sed editors, an exploration of




CVS and RCS, a guide to the gawk scripting language, and an overview of the Gnome and KDE desktop environments.

The last chapter features a guide to the rather outdated fvwm2 window manager. Window managers such as sawfish, KWM or Enlightenment are now more commonly used, so these pages would have been better used as a reference guide to the XF86Config file or to xset commands. Still, every Linux user needs a comprehensive command reference, and O'Reilly makes one of the best.

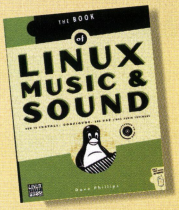
***Ashton Mills***

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## Linux Music & Sound

Now *this* is an interesting book. Linux is not known as a particularly music or sound-friendly platform. This is mainly because hardware support for sound under Linux has only matured in recent years. However, musical applications are plentiful — you can get everything from standard MP3 players to fully featured notation programs. *Linux Music & Sound* covers all of these and more.

The book begins with an overview of digital sound. It then covers hardware and software configuration so you can get sound working on your Linux system. The core of the book deals with the mixing, recoding and playing of sound under Linux. It covers popular sound




editors, mod files (still going strong after all these years), MIDI and everything you'd ever want to know about it, notation programs, synthesisers and MP3. It also shows you how to set up network audio software, such as RealPlayer and icecast for streaming media. The book is packed with screenshots and examples, and comes with a CD containing all the programs mentioned in the book.

If you are interested in music and Linux, this will satisfy your needs.

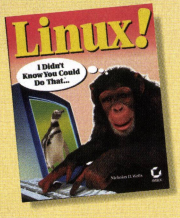
***Ashton Mills***

**Author** Dave Phillips
**Publisher** No Starch Press
**Contact** Woodslane
**Phone** (02) 9970 5111
**Price** $79.95
**ISBN** 1886411344
**Rating**

## Linux! I didn't know you could do that...

The gimmicky title and the monkey on the cover don't do the content of this book justice. The information it presents isn't usually covered in books; often it must be acquired through experience and experimentation.

The book covers standard Linux programs, the functions of which are often unknown to Linux beginners. There are good sections on network security, Web serving and disaster proofing your system. Much of this can be found in the Linux HOWTOs and elsewhere on the Web, but consolidating it into one book with easy-to-follow examples makes this




an excellent resource for new and experienced users alike.

The bundled CD isn't as useful as the book. It contains a collection of office, multimedia and administration tools, most of which are probably provided by your distribution. However, if you're interested in exploring the finer details of Linux, especially how to make the most of installed applications, this book contains some pearls of wisdom in an easy-to-follow guide.

***Ashton Mills***

**Author** Nicholas Wells
**Publisher** Sybex
**Contact** Woodslane
**Phone** (02) 9970 5111
**Price** $39.95
**ISBN** 078212612X
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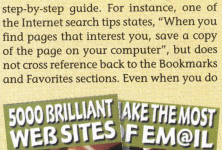
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## The .compact series

Computer Step .compact books are small, but each title contains 512 pages, so they aren't short on content. On the contrary, they're comprehensive and informative.

The series is "designed for today's Internet user, in easy to follow style". This is true of two of the three titles we reviewed, but *Make the Most of Em@il* suffers a little from information cram. It's all in there, but it takes constant reference to the contents pages to sort out where one section ends and the next begins. Despite this, the book will certainly open your mind to the many uses of email.

*Using the Internet* is packed with information, but does not always provide a step-by-step guide. For instance, one of the Internet search tips states, "When you find pages that interest you, save a copy of the page on your computer", but does not cross reference back to the Bookmarks and Favorites sections. Even when you do return to these sections they only tell you what commands are available — not how you should use them.




*5,000 Brilliant Web Sites* is an index of "carefully selected and categorised" sites which allows you to "take a break from searching".

The series is produced in the UK, and all the titles are UK-oriented, especially the Web sites book, but there's still plenty for everyone.

***Lindsay Hayman***

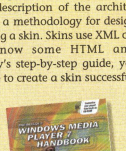
**Author** Brian Austin, Nick Vandome, Geoff Preston
**Publisher** Computer Step
**Contact** Penguin Books
**Phone** (03) 9871 2496
**Price** $14.95 each
**ISBN** 1840781106, 1840781084, 1840781092
**Rating**

## Microsoft Windows Media Player 7 Handbook

Our first reaction on picking up this book was to ask why anyone would want a book about Windows Media Player. Surely you just double-click on a file or click on a link, and it plays the content.

The book covers basic installation and use of Windows Media Player, and it also provides the technical background to media files and Internet audio and video. However, this book is really for people who want to develop skins and visualisations, or embed Windows Media in Web pages or multimedia applications.

A third of the book is devoted to skins. McEvoy provides a clear and well-structured description of the architecture, as well as a methodology for designing and building a skin. Skins use XML code, but if you know some HTML and follow McEvoy's step-by-step guide, you should be able to create a skin successfully.




Creating visualisations requires a working knowledge of C++ for Windows. A simple example is presented, but the book makes no attempt to work at the step-by-step level it offers for skin designers. Additional examples would be helpful. At least the accompanying CD-ROM includes the Windows Media Player SDK and a variety of other supporting files.

Do you really need to read a book to use Windows Media Player successfully? Perhaps not, but it's hard to imagine a better introduction to creating skins.

***Stephen Withers***

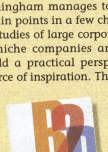
**Author** Seth McEvoy
**Publisher** Microsoft Press
**Contact** Woodslane
**Phone** (02) 9970 5111
**Price** $65
**ISBN** 0735611785
**Rating**

## B2B: How to build a profitable e-commerce strategy

This step-by-step guide to developing an online strategy combines a comprehensive overview of the fundamentals of B2B ecommerce with an explanation of ecommerce technologies.

Describing itself as a "definitive blueprint", *B2B* presents tools and advice to help you create and implement a profitable Web strategy. Author Michael Cunningham touches on a range of issues such as corporate culture, workflow, change management and the need for an integrated strategy. Each of these is worthy of an entire book in its own right, but Cunningham manages to do justice to the main points in a few chapters.

Case studies of large corporations and smaller niche companies are included which add a practical perspective and are a source of inspiration. The list of recommended readings is short and focuses on quality.




This book is aimed at the executives of bricks-and-mortar organisations who need to understand how to make the move into the 'new' economy. It is designed for those with a nontechnical background, and provides a comprehensive glossary and easy-to-understand diagrams.

*B2B* is by no means a technical guide, but it will still help you develop a basic B2B framework.

***Cathie Kennedy***

**Author** Michael J Cunningham
**Publisher** Allen & Unwin
**Contact** Allen & Unwin
**Phone** (02) 8425 0100
**Price** $39.95
**ISBN** 1865084778
**Rating**

**For a complete archive of Bibliofile columns, visit apcmag.com.**

*Maximise your hard disk space with these little-known tips.*

# Space rescue mission

The amount of hard disk space you can get for your dollar has become so great that even basic computers now come with drives over 10G. If you don't want to buy a new computer, adding another drive to your old one is easy — just throw $400 at the problem and, like magic, you have an extra 30G. Yet people still manage to run out of disk space.

Many basic tips for creating more disk space have been widely published — a Web search on the subject turns up plenty of results. You are advised to empty your recycle bin and your temp folder (more recent versions of Windows come with a Disk Cleanup utility that makes this easy), set your Web browser cache (which Microsoft Internet Explorer calls 'Temporary Internet Files') to a smaller size, uninstall applications and Windows components that you don't use, and get a backup device like a CD writer and use it to take files that you rarely use off the hard drive.

This month, we've gathered together some space saving tips that are not so commonly prescribed.

## Temp files

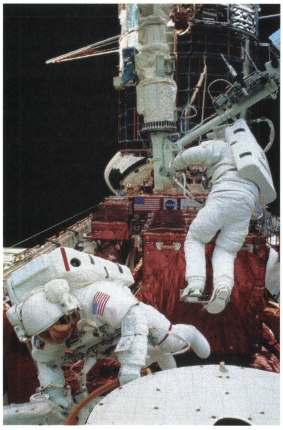
The standard temp directory is not the only place where orphaned temporary files accumulate when the programs that produce them crash or don't clean up after themselves properly. Some programs also make their own subsidiary temp folders, so search your drive (or drives) for anything called 'temp' and see what's inside.

Some programs make temp files in the same folder as data files. For instance, Microsoft Word makes ~$... files while it has a document open, and these aren't erased if Word is exited incorrectly. If your applications are set to make backups of files you're working on, delete the old backups when you have finished working with those files.

## Music files

If you have an MP3 collection, bear in mind that high bit-rate encoding is usually a waste of space. The difference between 160 kilobit per second (Kbps) and higher rates is often inaudible, so if you can't distinguish between them, use the lower rate. There are often noticeable flaws with 128Kbps MP3s, but 160Kbps files are usually immaculate.

Using the Windows Media Audio (WMA) file format makes digital music files even smaller. However, only use it if everything you want to play music on supports it. WMA isn't supported by most dedicated MP3 players. If you only play your music on computers that support WMA player software, you can make 96Kbps files that sound almost as good as 160Kbps MP3s.



## Compress files

Microsoft Outlook Express folder files tend to grow faster than the data in them. This is because Outlook doesn't compress the data unless you tell it to. Select File, Folder, Compact, or select Compact All Folders to do all of them at once.

If you have a lot of digital images and don't need your archived image files to be pixel-identical to the originals, save them as high-quality JFIF (JPG) files. This sacrifices nothing in real image quality, but can save a lot of disk space. Different imaging programs save JPGs differently, but files saved with Photoshop's quality setting '10' (two steps down from the maximum in current versions of Photoshop) are generally less than a sixth of the size than if saved as compressed TIFFs.

## Windows 2000

Windows 2000 has a few new ways to eat disk space. You can safely delete the 50M drivers.cab file in the winnt\driver cache\i386 directory. However, if you do, you'll be prompted for the Windows CD when you install new hardware that requires one of the stock drivers.

The Windows File Protection System, which prevents critical system files from being overwritten, keeps about 200M of file copies in winnt\system32\dllcache. You can reduce the cache size (to zero, if you like) by opening a command line (Start, Run and enter 'cmd'), then typing sfc /cachesize=x, where x is the file cache size in megabytes. If you restart your computer, open the command line again and type sfc /purgecache, and files above the limit you've set will be removed. Again, if Windows needs some of those files, you'll be asked to supply the install CD.

Another good idea in Windows 2000 and NT is to turn on drive compression. Compression is built into NTFS (NT file system), so any drive that's formatted in NTFS (which Windows 95 and 98 can't read) can be compressed.

To do this in Windows 2000, right-click the drive in the My Computer window, select Properties, and check the 'Compress drive to save disk space' option.

This won't help much if the data on the drive is already compressed, as is the case with JPGs and MP3s, but it can greatly reduce the space taken up by looser data formats and program install directories.

*Daniel Rutter*

For a complete archive of *APC* Step by Step columns, see apcmag.com.

Daniel Rutter can be contacted at dan@dansdata.com.

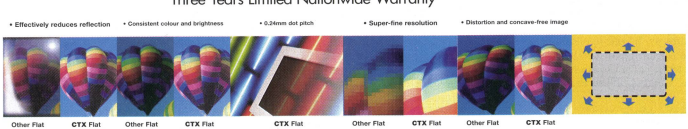
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*Learn how to edit and clean up your system's registry.*

# Registry cleanup

The registry is a central database that stores information relating to hardware, system settings and application configurations. Before the registry was introduced in Windows 95, all system and application settings were stored in INI and CFG files. The registry provides more information than these text files and its hierarchical structure is an improvement on the old storage system.

The registry is made up of a number of files. In Windows 95 and Windows 98 the registry is made up of two files stored in the Windows directory: SYSTEM.DAT and USER.DAT. The registry in Windows NT and Windows 2000 consists of five files (DEFAULT, SAM, SECURITY, SOFTWARE and SYSTEM) that are stored under \systemroot\System32\Config, where systemroot is the location of the Windows 2000 installation. There are also individual user registry files stored in individual user folders.

Data in the registry is stored hierarchically and displayed as keys, subkeys, values and data. This data can be of three types: binary, DWORD and string. The binary data type (REG_BINARY) stores values as raw binary data. Most hardware component information is stored as binary data, and is displayed in an editor in hexadecimal format. The DWORD data type (REG_DWORD) represents values with a four-byte number and is commonly used for Boolean values (for example 0 for disabled and 1 for enabled). The string data type is used to represent text values and can be a standard string (REG_SZ), a multistring (REG_MULTI_SZ) or an expandable string (REG_EXPAND_SZ).

## Backing up the registry

Editing the registry can be dangerous and is recommended for experienced users only. If you accidentally change or delete the wrong entry, applications can stop functioning or Windows can fail to start properly. However, if you are careful and have backups of the registry and important data, you shouldn't have any problems.

To resurrect your system after a registry mishap, restore it to the last known good configuration. To do this, restart your computer and follow these steps.

When Windows 2000 starts to load, press F8. Use the arrow keys to highlight 'Last Known Good Configuration', and press Enter. Windows 2000 then restores information in the HKLM\System\CurrentControlSet registry key. Any changes you have made in other registry keys remain.

At other times, Windows starts but the registry still has problems. In these cases the last known good configuration is of no use, but a recent backup of the registry on the hard drive helps.

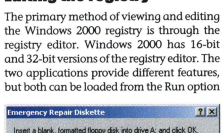
Backing up the registry is not particularly difficult. You can make copies of small portions of the registry using the Export Registry File command in the Registry Editor menu. It creates a text file with a REG extension that can be used to restore original settings using the Import command. A complete backup of the registry can be created and placed in the /systemroot/repair folder when you create a Windows 2000 emergency repair disk (ERD).

To create an ERD, go to Start, Programs, Accessories, System Tools, Backup. Select Emergency Repair Disk from the Welcome screen, then follow the onscreen instructions. Ensure that you check the 'Also back up the registry to the repair directory' checkbox. The individual registry files are backed up to your hard disk as they are too large to fit on a floppy. The average size of the entire registry on many machines is about 20M.

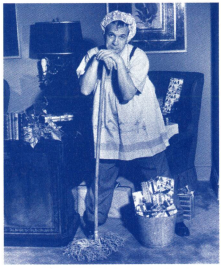
Another way to make a backup of the registry is to back up your system state. This can be done from the Backup Wizard or Backup tab. A backup of the system state will include the registry, the COM+ Class Registration Database, and the system boot files. You can restore this system state backup using the Restore Wizard.

## Editing the registry

The primary method of viewing and editing the Windows 2000 registry is through the registry editor. Windows 2000 has 16-bit and 32-bit versions of the registry editor. The two applications provide different features, but both can be loaded from the Run option




▲ A backup of the registry can be made when you create an ERD.



in the Start menu. Type 'regedit' to load the 16-bit utility, and 'regedt32' to load the 32-bit utility.

Both registry editors display the registry as a system of keys, subkeys and values. The two editors have different interfaces. RegEdit has a Windows Explorer-like interface displaying subtrees, while RegEdt32 maintains a separate window for each of the HKEY subtrees.

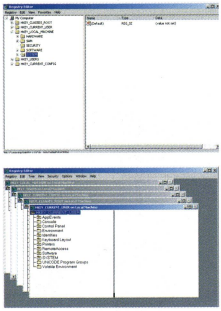
RegEdt32 has some additional features not found in the 16-bit version, including the ability to view and modify security permissions. This enables a read-only mode of the editor and allows modification of the extended string values. Unlike RegEdt32, RegEdit has the ability to search through both registry keys and values for a specific piece of text or numeric value.

When viewing the registry, you can expand branches by clicking on the plus sign or by double-clicking. To display the contents of a key, click on it. Its contents will be displayed to its right. New keys and values can be added by selecting New from the Edit menu. You can rename keys and values through RegEdit by right-clicking the selected object and choosing Rename.

## Registry hacks

Now that you know some of the basics of the registry, you can make some changes. Here are a couple of hacks to experiment with.

Most administrative tools require administrative privileges to use them, but you may want to prevent them from being displayed in the Start menu. To prevent a particular person accessing the



▲ Windows 2000 boasts two versions of the Registry Editor, RegEdit RegEdt32.

tools, log on as that person and go to HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\Explorer\Advanced. Create a new string value called 'StartMenuAdminTools' or modify the existing value to equal 'no' to hide the Administrative Tools folder or 'yes' to show it.

Occasionally, when Windows shuts down, a task returns as 'Not Responding'. Instead of ending the task manually, use a hack to automatically close any nonresponding applications. Go to HKEY_CURRENT_USER\Control Panel\Desktop. To automatically kill tasks, change the value of 'AutoEndTasks' to 1. To prompt for action, change it to 0. You can also reduce the time you wait until the application is killed by reducing the value (measured in milliseconds) of 'WaitToKillAppTimeout'.

If you never use the My Computer icon and want to remove it from the desktop, navigate to HKEY_CLASSES_ROOT\CLSID\20D04FE0-3AEA-1069-A2D8-08002B30309D. Back up the key in case you change your mind later on, then delete it and all of its subkeys.

If you don't want to hack the registry manually, install a program such as TweakUI. With TweakUI you can run the most popular customisations without having to use RegEdit. To install TweakUI, unzip the self-extracting file (which can be found on this month's cover CD) to a folder. Right-click the file called TWEAKUI.INF and select Install. The TweakUI icon will then appear in the Control Panel window.



▲ TweakUI is the easy, and safe, way to change registry settings.

## Cleaning the registry

As programs are installed and uninstalled the Windows registry becomes bloated and fragmented. This can negatively affect system performance, so you should relieve the registry of unwanted data on a regular basis.

To see an estimate of the current registry size, open the System Properties window from the control panel or by selecting Properties from My Computer (you must have administrator privileges to do this). Click Performance Options under the Advanced tab, and then click Change. An estimate for the current registry size and a value for the maximum registry size is displayed at the bottom of this window. You might need to increase the maximum registry size if the amount of registry data produced exceeds the set limit. If you clean up the registry using the methods described below, this shouldn't be necessary.

One of the most common causes of registry bloat is the debris left behind when you uninstall an application. Uninstall utilities are supposed to delete all registry entries belonging to an application, but this doesn't always happen. Often the uninstaller leaves obsolete entries behind. If you don't do anything about them they stay in the registry, taking up space and adding to the clutter.

These entries are usually easy to identify. In most cases, they are stored in two distinct locations: HKEY_CURRENT_USER\Software and HKEY_LOCAL_MACHINE\Software. These two branches are specifically used by the applications installed on the computer. The main difference is that HKEY_LOCAL_MACHINE\Software holds settings specific to the computer, whereas HKEY_CURRENT_USER\Software holds settings that relate to the currently logged-on user.

Use one of the registry editors to go to either of the locations mentioned above. You'll see that there are subkeys for each developer who has an application installed on the computer. These, in turn, contain subkeys for each application. If you find entries relating to applications that you know you've uninstalled, delete the branches for these applications. This is arduous, but it is the only way to do it.

Microsoft's RegClean utility is an automatic registry cleaner. It analyses the registry keys that are stored in HKEY_CLASSES_ROOT. It finds keys that contain incorrect values, records those entries in an Undo file, and removes them from the registry. You can restore the registry to what it was previously by double-clicking on the Undo file.

You can find RegClean on this month's cover CD. When you execute the file you must specify a folder for the program files to unzip to. To start RegClean, open the folder you unzipped to and execute the REGCLEAN.EXE file.

*Keiran McNamee*

Keiran McNamee can be contacted at kmcnamee@acptech.net.

## Windows shareware

### Babylon 3.1

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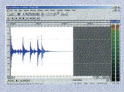
### iMesh 2.0

Use this program to download files from other iMesh users.

### Odigo 3.0

Here's a way to combine your buddy lists from different instant messaging programs.

### Sound Forge 4.5



Create and edit your own digital music with Sound Forge.

**These programs and others can be found on this month's cover CD, along with more detailed reviews.**

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*Compare files quickly using two handy command-line utilities.*

# Comparing files

Sometimes it is useful to compare two files to find out whether (and perhaps how) they are different from each other. For example, you might want to compare lists of filenames, hostnames or words. You can use the cmp and diff utilities to do this.

## Are they different?

The cmp (comparison) utility is the simpler of the two, and it can be used to tell whether or not two files are the same. To use it, type `cmp file1 file2`. If the files are the same, it outputs nothing, but if the files are different it tells you on what character and line they first differ.

Let's look at the example files shown in figures 1(a) and 1(b). The two files look very similar, but they differ slightly in three places. The output of cmp file1 file2 in this case is the following.

```
file1 file2 differ: char 88, line 3
```

```
Full many a glorious morning have I seen
Flatter the mountain-tops with sovereign eye,
Kissing with golden face the meadows green,
Gilding pale streams with heavenly alchemy;
Anon permit the basest clouds to ride
With ugly rack on his celestial face,
And from the forlorn world his visage hide,
Stealing unseen to west with this disgrace:
Even so my sun one early morn did shine
With all triumphant splendor on my brow;
But out, alack! he was but one hour mine;
The Region Cloud hath mask'd him from me now.
Yet him for this my love no whit disdaineth;
Suns of the world may stain when heaven's sun
staineth.
```

▲ Figure 1(a)

```
Full many a glorious morning have I seen
Flatter the mountain-tops with sovereign eye,
Gilding pale streams with heavenly alchemy;
Anon permit the basest clouds to ride
With ugly rack on his celestial face,
And from the forlorn world his visage hide,
Stealing unseen to west with this disgrace:
Even so my sun one early morn did shine
With all triumphant splendor on my brow;
But out, alack! he was but one hour mine;
The region cloud hath mask'd him from me now.
Yet him for this my love no whit disdaineth;
Suns of the world may stain when heaven's sun
staineth.

-- Sonnet XXXII, Shakespeare
```

▲ Figure 1(b)

If you look at the third line of both files you'll see that the first file has one more line than the second.

The exit status of the cmp utility can be used within shell scripts to perform different actions, depending on whether or not two files are the same. If the files are the same, the exit status is 0; if the files are different, the exit status is 1. If you don't want cmp to display anything, even if the files are different, use the switch -s (for 'silent'). In the following example the shell script silently deletes file2 if it is the same as file1.

```
if cmp -s file1 file2; then
  rm -f file2
fi
```

## How are they different?

The diff utility is far more powerful than cmp because it can describe exactly how files are different and can work on entire directory trees as well as a pair of files. However, diff is only useful with text files, whereas cmp can be used with binary files (the -l switch to cmp displays the values of each byte that is different).

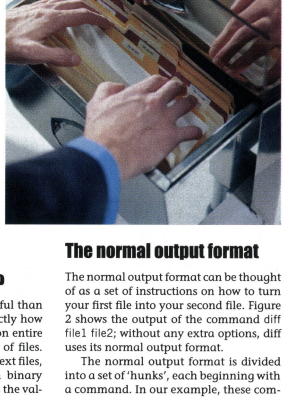
diff has four commonly used output formats. These are alternate ways of diff describing how the files are different. These four output formats are:

- normal
- context
- unified context
- side-by-side

The format you choose depends on the format of the files you are comparing and your personal preference.

```
3d2
< Kissing with golden face the meadows green,
12c11
< The Region Cloud hath mask'd him from me
now.
---
> The region cloud hath mask'd him from me
now.
14a14,15
>
> -- Sonnet XXXII, Shakespeare
```

▲ Figure 2: The normal output format



## The normal output format

The normal output format can be thought of as a set of instructions on how to turn your first file into your second file. Figure 2 shows the output of the command `diff file1 file2`; without any extra options, diff uses its normal output format.

The normal output format is divided into a set of 'hunks', each beginning with a command. In our example, these commands are 3d2, 12c11 and 14a14,15. The letter sandwiched between the numbers says whether lines should be deleted (d), changed (c) or added (a).

After each command, the lines that are affected in the first and second files are displayed — lines which are only in the first file are shown with a leading <, and lines which are only in the second file are shown with a leading >. If you know this, you can read diff output without understanding the commands, but it's also useful to know how the commands work.

The first command (3d2) means that to turn the first file into the second file you need to delete line 3 from the first file. That line is then shown after the command. When reading the output of diff, you can usually ignore the number after the d (in this case, the 2), as it only indicates where in the second file you need to place the deleted line if you want to turn the second file back into the first file.

The second command (12c11) means that the twelfth line from the first should be changed into something different in the

```
*** file1 Fri Dec 22 04:13:52 2000
--- file2 Fri Dec 22 04:13:04 2000
***************
*** 1,6 ****
  Full many a glorious morning have I seen
  Flatter the mountain-tops with sovereign eye,
- Kissing with golden face the meadows green,
  Gilding pale streams with heavenly alchemy;
  Anon permit the basest clouds to ride
  With ugly rack on his celestial face,
--- 1,5 ----
***************
*** 9,14 ****
  Even so my sun one early morn did shine
  With all triumphant splendor on my brow;
  But out, alack! he was but one hour mine;
! The Region Cloud hath mask'd him from me
  now.
  Yet him for this my love no whit disdaineth;
  Suns of the world may stain when heaven's sun
  staineth.
--- 8,15 ----
  Even so my sun one early morn did shine
  With all triumphant splendor on my brow;
  But out, alack! he was but one hour mine;
! The region cloud hath mask'd him from me now.
  Yet him for this my love no whit disdaineth;
  Suns of the world may stain when heaven's sun
  staineth.
+
+ -- Sonnet XXXII, Shakespeare
```

▲ Figure 3: The context output format

second file. The replacement text would end up on line 11 in this case, because one line will have already been removed.

The previous commands affect only one line at a time, but the third command (14a14,15), would add two lines. The 14a means that after line 14, the following lines should be added. The '14,15' means that these lines would end up as lines 14 and 15 in the second file.

The normal diff output format is most appropriate when you are comparing two files where each line is independent of the other lines. For example, if you have two lists of something (such as filenames, hostnames or words) where each item is on a line by itself, the normal output format of the diff command tells you the differences between the two lists. In some cases, it's useful to sort both lists with the sort command first.

## The context output format

When comparing two text files, you'll often want to see some context around each change. This is what the context output format does. The diff -c file1 file2 command would produce the output shown in figure 3.

The context output format is divided into hunks of changes again, but instead of commands there is a row of asterisks separating each hunk. Each hunk in the context format might show part of one or

```
Full many a glorious morning have I seen
Flatter the mountain-tops with sovereign eye,
Kissing with golden face the meadows green,
Gilding pale streams with heavenly alchemy;
Anon permit the basest clouds to ride
With ugly rack on his celestial face,
Even so my sun one early morn did shine
With all triumphant splendor on my brow;
But out, alack! he was but one hour mine;
- The Region Cloud hath mask'd him from me now.
+ The region cloud hath mask'd him from me now.
Yet him for this my love no whit disdaineth;
Suns of the world may stain when heaven's sun
staineth.
Sonnet XXXII, Shakespeare
```

▲ Figure 4: The unified output format

both of the two files. If lines need to be removed or added within one hunk, only the first or the second file would be shown. An example of this can be seen in the first hunk in figure 3, where the third line was removed.

In the second hunk, the tail end of both files is shown. The ! marks the line that would be changed, and the + marks the lines that would be added.

By default, up to three lines of context are shown. If you want more or less context you can try a command such as diff -c5 file1 file2. If you use -c0, you get output similar to the normal format.

## The unified output format

The unified output format is similar to the context format, but instead of showing a hunk of the first file followed by a hunk of the second file, lines that differ are shown directly above and below each other (see figure 4).

As in the context output format, the number of lines of context defaults to three, but you can specify a different number using this similar command.

```
diff -u5 file1 file2
```

The unified diff output is more compact than the context diff output, but in some cases, depending on the file format, the differences are clearer using the context output.

## The side-by-side output format

The side-by-side format shows the two files side by side. This is often the clearest way to show differences, but if the lines in the files are 80 characters long, each line

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Win4Lin allows Linux users to run Windows and Windows applications inside a window on the Linux desktop.




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appears truncated if your terminal window isn't wide enough to fit everything in (see figure 5).

To select the side-by-side format, use the -y switch. diff will assume a terminal that is about 130 characters wide, but you can override this with the -W switch using the following command.

```
diff -y -W 80 file1 file2
```

## Comparing directories

If you have two directories with similar contents, specify the names of the two directories and diff will compare the contents of the corresponding files in both directories. If you want the contents of subdirectories compared as well, use the -r (for 'recursive') switch in the following command.

```
diff -r directory1 directory2
```

## When is diff useful?

The diff command can be used in the following situations.

- If you have two copies of a file and are not sure which one is the latest version, you can use diff to help you determine this.
- If you make a backup of a system configuration file before modifying it, you can later tell exactly what changes you made.
- If one file is copied and changed by two different people, you can use diff to discover exactly what changes one person made so that the changes can be added to the second person's copy.
- In the free software world many programmers often work on the same files. By sending the output of diff (also known as a 'patch') instead of the entire contents of the files to the master maintainer of the files, the maintainer can easily see what changes each programmer has made and integrate them.
- If you want someone to make comments on a file you have created, the comments can be put in the file. When you want to see what was written, use diff to compare your original version and the file you received.

The information pages for diff (type info diff) provide an in-depth reference to cmp, diff and a few other related utilities. The man pages for cmp and diff (type man cmp or man diff) have a summary of the available command-line options.

*Geoffrey Bennett*

```
Full many a glorious morning have I s Full many
a glorious morning have I s
Flatter the mountain-tops with sovere Flatter the
mountain-tops with sovere
Kissing with golden face the meadows <
Gilding pale streams with heavenly al Gilding
pale streams with heavenly al
Anon permit the basest clouds to ride Anon per-
mit the basest clouds to ride
With ugly rack on his celestial face, With ugly
rack on his celestial face,
And from the forlorn world his visage And from
the forlorn world his visage
Stealing unseen to west with this dis Stealing
unseen to west with this dis
Even so my sun one early morn did shi Even so
my sun one early morn did shi
With all triumphant splendor on my br With all
triumphant splendor on my br
But out, alack! he was but one hour m But out,
alack! he was but one hour m
The Region Cloud hath mask'd him from I The
region cloud hath mask'd him from
Yet him for this my love no whit disd Yet him for
this my love no whit disd
Suns of the world may stain when heav Suns of
the world may stain when heav
                >
> -- Sonnet XXXII, Shakespeare
```

▲ Figure 5: The side-by-side output format

Geoffrey Bennett can be contacted at geoffrey@netcraft.com.au.

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*Use a mobile phone to connect your Pocket PC to the Web.*

# Make the connection

This month's column shows how to connect a Pocket PC or Windows CE device to the Internet or to a corporate network. You'll need a mobile phone with an infra-red port and built-in modem, but the same principles apply to other types of modems. For phones without a built-in modem such as the Nokia 6110, Psion has an external infra-red modem that costs a little over $400 and also works with Pocket PC, Palm devices and other handheld PCs.

Current GSM (global system for mobiles) mobile phone connections are slow — only 9.6Kbps. GPRS (general packet radio service) and 3G networks are much faster, but they're not yet available in Australia. The slowness of GSM makes frequent Web browsing impractical, but it works well for basic email and for occasional Web browsing.

Before we start, there are some points to check. Some corporate networks use en-hanced security that might not allow you to connect with your PDA. Before using the modem on your phone, you also need to get your mobile phone carrier to activate the data services on your phone. This is extremely important because most phone contracts don't have this feature set up by default.

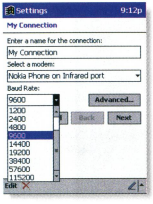
You need to install a modem driver on your PDA. To do this, check if your phone came with a CD or if you can download the modem driver from the Net. If a specific driver is not available, you can probably use the generic IrDA modem in your PDA's modem settings. When you have the driver, follow the instructions; it's usually a simple process.

To set up your modem, tap on the Start menu, select Settings and tap on the Connections tab at the bottom of your screen. Next, tap on the Modem icon to configure your Internet or office connections. Tap on the New Connection item and label it something like 'Internet connection'. Tap on the 'Select a modem' pull-down menu and select your specific mobile phone modem or the generic IrDA modem setting. You can choose a standard landline modem if you have a serial cable to connect it to. Next, tap on the Baud Rate pull-down menu and select 9,600 baud. If you have a corporate network that uses SPAP (secure password authentication protocol), tap on the Advanced button. Tick the 'Use terminal after connecting' box so that you are manually prompted for a username and password each time you connect. This helps circumvent many authentication problems.

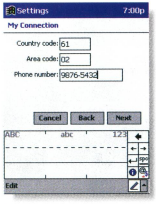
To finish, tap on the Next button to advance to the telephone settings and enter your dialup number. Tap on Next again if you need to enter any special credit card calling information. Some phone networks have nonstandard dial tones and you may need to untick the 'Wait for dial tone before dialling' box to get your modem to dial. Tap on the Finish button and your dialup connection should be ready for use.

Now you need to enable the infra-red port on your mobile phone. To do this, tap on the Start menu and go to the Programs folder. Tap on the Connections folder and select the connection you just created. Enter your username, password and domain (only on a corporate network), and select any dialling locations you may need to use. You can also tick the 'Save password' box, but some people consider that this creates a security risk.

To test the connection, place your phone and PDA on a flat surface between 1 and 3cm apart and align the infra-red ports. Bright light can affect the quality of your connection, so block it out by placing a piece of paper over the phone and PDA. Tap on the Connect button and




▲ Tap the 'Select a modem' menu and select your mobile phone modem or the 'Generic IrDA modem' setting.

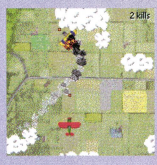



▲ Tap on the Next button to advance to the telephone settings, then enter the dialup phone number.

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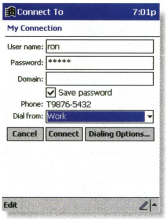

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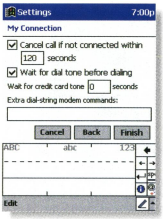
### TimeTTracker 2000

Track time and expenses on your Pocket PC with this program.

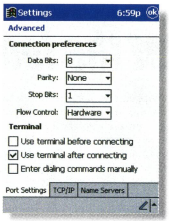
**All these packages and more can be found on this month's cover CD, along with more detailed reviews.**




▲ You need to enter your username and password.




▲ Some phone networks have nonstandard dial tones, so you may need to untick the 'Wait for dial tone before dialling' box.




▲ If you have a corporate network that uses SPAP, tap the Advanced button.

your Pocket PC should begin the dialling sequence. If the connection works, you can open up the pocket Internet Explorer and start surfing. Your PDA can be used to check mail, surf the Web, read newsgroups, use Internet chat, and even run Terminal Server and Citrix sessions.

It's also possible to access Internet-based mailboxes by setting up a POP3 account in your mail program. It's a good idea to set up the Pocket PC to pull down email headers only, so that you don't waste time downloading junk email. You can also set up more than one connection, depending on the different cities you travel to, and set dialling location information by tapping on the dialling button at the bottom of your connection screen. This is useful if you travel a lot and use different dialup connections.

Most ISPs only allow you to send mail from their SMTP server if you've dialled into their network. This is because it enables them to avoid any misuse of their servers by spam mail. If you have multiple dialin settings from different ISPs, you might need to change your SMTP mail settings when you dial into these networks, or you might need to set up multiple accounts.

This and other connectivity issues will be covered in much more detail in future PDA columns.

*Ronald Rosenbaum*

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**Ronald Rosenbaum can be contacted at ron@ats.au.com.**




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ACP Tech

*Give your Mac a facelift using the Appearance control panel.*

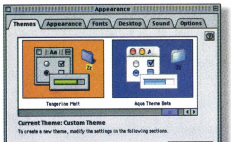
# Get the look

The Appearance control panel is used to configure the look of your Mac's screen. You can use it to change the desktop pattern or picture, the fonts used for menus and the Finder, as well as other settings. This month, we show you how to use the Appearance controls to give your Mac a facelift.

## Themes

Appearance has a tab that allows you to choose or save preset desktop settings in the form of themes. Mac OS comes with a reasonable selection of themes, and you can download more from Web sites such as Mac OS Resources (www.macosr.com). Unstuff the file, then drag the theme file onto the closed system folder before opening the Appearance control panel.

Once in Appearance, use the scroll bar in the Themes tab to browse through the installed themes. When you find a theme you like, click on its picture to apply the new settings. You can also use one of the preset themes as a starting point for your own changes. If you decide to make changes or you want to create a new theme from scratch, you need to click the Save Theme button and enter a name for your theme.




▲ Third-party themes, such as this Aqua theme, are often more interesting than those that come as standard with Mac OS.




▲ Kaleidoscope is a popular interface enhancement with thousands of themes — this one is inspired by *Star Trek*.

## Appearance

The term 'theme' is used in two senses: for the broad design elements mentioned earlier, and for groups of settings in the second tab — the Appearance tab. This tab is used to determine styles for windows, menus and other interface elements. For some reason, Apple decided to release only one design for this tab: Apple Platinum. Luckily, more of these themes have been created by enthusiasts (see www.appearance-archive.com and Mac OS Resources).

In a standard Macintosh configuration, the Appearance tab can only be used to alter the highlight and variation colours. The highlight colour is used to indicate selected text, so choose something that contrasts well with both black and white. When using a PowerBook, iBook or other LCD screen, you may find that the shade you like to use on your CRT monitor doesn't look as pleasant. If none of the preset shades appeal, go straight to the last item in the pop-up menu (Other) and use the Color Picker to choose your ideal colour.

There are several different colour pickers in the palette at the left of the main Picker window. Most people are happy with the Crayon picker (just click on the crayon you want to use), but other pickers provide more control. The CYMK or HTML pickers are a good choice for print or Web designers. The HSL picker allows you to choose a basic colour from a wheel and then vary its lightness. A good mix has a hue angle of 320° with 100% saturation and 75% lightness (if you go back to the Crayon picker, it calls this colour 'Grape-ish'). Whether or not this looks attractive depends on the other colours used on your desktop.

The variation colour is used for the thumbs in scroll bars and to highlight the selected item in normal or pop-up menus. The Appearance control panel limits you to a fixed set of 21 variation colours, so pick whichever is the best match for your desktop background.

For yet more theme ideas try the shareware utility Kaleidoscope (see this month's cover CD). The basic package comes with eight schemes, but there are thousands of other Kaleidoscope themes available.

## Fonts

Font settings should be changed with care. The large system font — used for menus, buttons, window titles and so on — must be chosen from a limited selection to ensure that the text is properly displayed. For example, if you choose a very wide font, the label might not fit within the confines of its button. You only have one choice for the small system font: Geneva.

Geneva is also a good choice for the views font. 10pt Geneva is the right size for both jobs, and it's a good idea to keep the number of fonts onscreen to a minimum. Espy Sans (a font Apple designed for clarity on computer screens) is another good choice, but some characters that are invisible in Geneva are displayed as rectangular boxes in this font. There is an Espy Sans clone called Espi Sans in the Kaleidoscope package.

Apple's default setting for font smoothing isn't always effective. Smoothing is useful, but some common fonts look unattractive when smoothed at small sizes. Leave smoothing turned on, but adjust the minimum size to 18pt.

## Desktop

You can have a lot of fun (or waste a lot of time, depending on your perspective) in the Desktop tab. You can choose a pattern or picture to act as your desktop background. Scroll through the list of patterns and click once on the name for a preview. You can also drag and drop graphics up to 128 pixels square from another program such as a Web browser or the Scrapbook directly onto the preview window. Copy and paste works too, but if you use this method graphics larger than 128 pixels in either dimension are scaled to that size. The images are tiled to fill the screen.

Any desktop pattern you create using drag and drop or cut and paste is called Untitled Pattern. To change the name, make sure it is still selected (if not, click once on Untitled Pattern in the list of patterns), choose Pattern Name from the Edit menu and enter a more descriptive name.

A larger image used as a desktop background is called a desktop picture. You can drag a graphics file (usually a JPEG image, but other types are supported) directly onto the preview area of the Appearance

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*Corporate IT Magazine June 2000*

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▲ Webshots gives you a new photo each day for your desktop background.

control panel, or you can click the Place Picture button and then open the file you want to use. Mac OS installs a selection of desktop pictures in a folder called Desktop Pictures, which is inside Appearance in the System Folder. More pictures and patterns can be found in the CD Extras folder on the Mac OS CD-ROM. You can select pictures from any folder by using drag and drop or Place Picture. If you drop a folder of images onto the preview, Mac OS chooses one of them at random on startup.

If the picture you choose isn't the same size as your screen, you have a number of options. First, the Position Automatically option scales the picture so it is as large as possible without needing to be cropped. If the picture doesn't have the same proportions as the screen (4:3), there will be some space at the top and bottom, or left and right sides. If that's the case, your desktop pattern will be visible in those areas. Scale to Screen has the same effect as Position Automatically.

Tile on Screen uses the picture as a pattern, and repeats it as many times as necessary to fill the screen. If the picture is bigger than the screen, it displays the top left portion at full size and crops the rest.

Center on Screen centres the picture at full size and crops the edges to fit or displays some of the desktop pattern to fill in the gaps. Fill Screen, on the other hand, stretches or squeezes the picture in each dimension so it exactly fills the screen. The distortion this causes can be unacceptable, but it's sometimes worth trying.

When you like what you see, click the Set Desktop button and close the control panel.

Webshots Desktop Lite (find it at www.webshots.com/html/download.html) is a freeware utility from Excite that uses your Web browser to download a 'photo of the day' from the Internet for your desktop. There are thousands of professional quality photos in the Webshots image library, organised into categories such as animals, seasons and space. Most are only available at 800 by 600 resolution, which looks jaggy on higher resolution displays. The solution is to enable image resampling (choose Preferences from the Options menu in Webshots Desktop Lite), but this slows down screen redraws if memory is too low. There are also millions of 'community' photos provided by Mac owners.

## Sound

The Appearance control panel also has a Sound tab which has nothing to do with the Mac OS sound controls. This menu is used to add sound effects to actions such as activating a menu or dragging a window.

Once again, Apple has provided only one set of sounds (called Platinum Sounds), but there is a selection available from Mac OS Resources. After downloading and unstuffing, drop the sound set file onto the closed system folder. You can customise these sets with SoundThemeChanger ($US10 shareware; see this month's cover CD), but make sure you work on a copy of the original set.

Sound tracks are fun, but they get stale quickly. Don't be surprised if you find yourself turning off all sounds after a while. If you want to turn off some sounds and leave others on, uncheck the unwanted items in the Sound tab.

## Options

This is where you'll find all of the items that don't fit anywhere else. Smart Scrolling is a handy feature that puts both of the scroll arrows at one end of the scroll bar. It collects all arrows in the lower left corner of windows, which reduces the amount of mouse movement needed. It also varies the size of the scroll box according to the amount of content visible in the window. A scroll box that almost fills the scroll bar means you can see almost all the content. Not all programs support this feature. Another option allows you to collapse windows by double-clicking on the title bar. This saves you from having to bring a partially obscured window to the front before you can windowshade it, but there's a risk of accidental windowshading.

Experiment and see what suits you.

*Stephen Withers*

# Mac OS shareware

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## ImageBuddy 1.0.4

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## OneApp Slide Show 5.6.5

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**These programs and more can be found on this month's cover CD, along with more detailed reviews.**

Stephen Withers can be contacted at swithers@ozemail.com.au.

For a complete archive of *APC* Mac OS columns, see apcmag.com.

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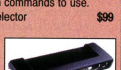
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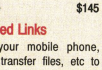
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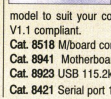
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*Continue building your craps game in C++.*

# On a roll

This month, we continue the project we began in February: writing a craps game program. Last month, you built the CDice class, which emulates a normal die. You can now incorporate that class into the next stage.

The next step is to build the CCraps class, which plays a single game of craps. Listing 1 shows the declaration of the CCraps class. As with many of the listings, it has to be compressed a little to fit into the magazine's columns, so check the source code on this month's cover CD.

Practical C++ takes a slightly different design strategy this month. Usually each module is begun with the directive 'using namespace std', which allows all of the std namespace objects and functions to be used without a namespace prefix. If that directive is not present, every reference to an object or function from the std namespace must be prefixed. For example, `cout << endl;` becomes `std::cout << std::endl;`.

The former is shorter and clearer, so why isn't it used every time? The std namespace is huge and complex. There are an enormous number of classes, templates and functions, and there's a good chance that one of these will clash with an object or function name in your own project. In big projects, the 'using namespace std' directive is almost always avoided. It's often used in this column because the code has to fit into narrow columns and `std::cout<<std::endl` is much longer than `cout<<endl`. However, as more complex projects are developed, we'll 'rough it' and live without the 'using namespace std' directive.



## Include files

In listing 1, the file Craps.h begins by including four header files. The first file, iostream, provides access to stream I/O. The next is vector, which is included to the STL 'vector' template (see *APC* June 2000, page 146). The utility include file provides access to the pair template. The pair template was touched on in September (see *APC* September 2000, page 146), but it's revisited below. Finally, Dice.h is included. It declares the CDice class, which you created last month.

The declaration of the CCraps class appears next in listing 1. This class has three public methods (functions): the constructor, Play() and Display(). The Play() method plays one game of craps (as you see in listing 2) and the Display() method prints the results of the game. The Display() method takes an argument, which is an output stream. You can pass in std::cout to display the results in the console window, or you can create a file stream and save the results in the file. The parameter has a default value of std::cout, so you can omit the parameter altogether and the Display() method will use std::cout for output.

The CCraps class has one private method, one private typedef and four private data members. As a private method, the RollDice() method can only be called from within the CCraps class. When you look at the method implementations, you'll see it is used by the Play() method.

The typedef uses the std::pair template. This refers to a pair of objects. The objects may be of the same type or of different types. The declaration, `std::pair<unsigned, unsigned>` uses two unsigned integers to represent two dice rolls. Because the declaration is a little long, you create a typedef: rollPair_t. This typedef means that wherever you see rollPair_t, it is equivalent to `std::pair<unsigned, unsigned>`.

The m_rolls data item is a vector of rollPair_t objects. That is, it's a vector of pairs of unsigned integers. Every roll of the craps game involves rolling two dice, and these two values are stored in the m_rolls vector.

The m_nrolls member stores the number of rolls you have played. This equates to the number of elements in the m_rolls vector.

The m_win data member is a Boolean (true or false) value which indicates whether or not you won the game.

The dice member is an object of class CDice, which is used for dice rolls.

Listing 2 contains the implementation of the methods of the CCraps class. The implementation of the constructor is quite simple: it initialises the m_rolls and m_win data members.

The private RollDice() method creates a temporary rollPair_t object and initialises it with two calls to the CDice.Roll() method. It then appends the pair to the m_rolls vector using the vector.push_back() method, increments the m_nrolls data member to indicate that a roll has taken place and returns the sum of the two dice rolls.

The Play() method is slightly more complex. It has two Boolean flags: win and lose. It indicates whether the game has been won or lost and loops indefinitely until there is a result. Each loop, it calls the RollDice() method, which returns the sum of the dice that were rolled. If the m_nrolls data member equals 1, this is the first roll and different win/lose rules apply. Each time through the loop, the last value rolled is tested to determine whether the game has been won or lost. If so, the loop ends.

The last line, `return m_win=win`, is a little tricky. It can be easily misread as

## C++ source code

**Listing 1: Craps.h**

```
#if !defined(CRAPS_INCLUDED)
#define CRAPS_INCLUDED

#include <iostream>
#include <vector>
#include <utility>
#include "Dice.h"

class CCraps {
public:
 CCraps();
 bool Play();
 void Display(
   std::ostream &os
   =std::cout);
private:
 unsigned RollDice();
 typedef
   std::pair
     <unsigned, unsigned>
     rollPair_t;
 std::vector<rollPair_t>
   m_rolls;
 CDice dice;
 unsigned m_nrolls;
 bool m_win;
};
#endif
```

**Listing 2: Craps.cpp**

```
##include "Craps.h"

CCraps::CCraps()
: m_nrolls(0)
, m_win(false)
{
}

unsigned CCraps::RollDice()
{
 rollPair_t r(dice.Roll(),
              dice.Roll());
 m_rolls.push_back(r);
 m_nrolls++;
 return r.first + r.second;
}

bool CCraps::Play()
{
 bool win=false, lose=false;
 unsigned target=0;
 unsigned last;

 m_nrolls = 0;
 while (!win && !lose) {
  last = RollDice();
  if (m_nrolls==1) {
   // first time
   // 7, 11 wins
   // 2, 3, 12 loses
   win = last==7 ||
         last==11;
   lose = last==2 ||
          last==3 ||
          last==12;
   target = last;
  } else {
   // other times
   // target wins
   // 7 loses
   win = last==target;
   lose = last==7;
  }
 }
 // assign, not compare
 return m_win=win;
}

void CCraps::Display
       (std::ostream &os)
{
 os << "Rolls" < std::endl;
 int i;
 for (i=0;i<m_nrolls;i++){
  os << i+1 << '\t'
     << m_rolls[i].first
     << " + "
     << m_rolls[i].second
     << " = "
     << m_rolls[i].first +
       m_rolls[i].second
     << std::endl;
 }
 if (m_win)
  os<<"Congrats! You won."
    <<std::endl;
 else
  os<<"Bad luck. You lost."
    <<std::endl;
}
```

**Listing 3: main.cpp**

```
##include "Craps.h"

int main()
{
 CCraps cr;

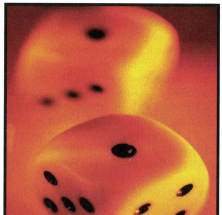
 cr.Play();
 cr.Display();

 return 0;
```

**All these listings can be found on this month's cover CD.**

'return true if m_win is equal to win, otherwise return false', but that's not the case. If you want it to say this, use ==, not =. It really means 'assign win to m_win, then return that assigned value'. This saves the value of the local variable, win, in the class data member, m_win, then returns that value. In a commercial application, you'd avoid this type of code as it can confuse people. However, it's included here to point out the possible trap.

Finally, there is the Display() method. This loops through all of the members in the m_rolls vector outputting each roll, plus the sum, before outputting a message indicating the result.



## Test your class

Listing 3 is a short program to test your class. It plays one game and displays the results. A more thorough program might play several games and allow the player to bet and keep track of their winnings and losses. We haven't covered such a program because of space constraints. Try writing one yourself. Send us your full-blown craps programs and *APC* will publish the best and send the winner a mystery prize.

Until next time, keep on coding!

*Michael Smith*

**For a complete archive of *APC* C++ columns, see apcmag.com.**

**Michael Smith can be contacted at emmenjay@zip.com.au.**

*Find out how to use recursion, one of Java's trickier concepts.*

# Shrinking problems

Recursion is the process of defining something in terms of itself. This is rarely useful; imagine a dictionary that defines a circle as a sort of oval and an oval as a sort of circle.

However, in mathematics and computing, recursion can be very useful. A recursive solution to a problem means that you can formulate progressively simpler versions of the same problem.

Almost all modern programming languages, including Java, support recursion. It's important, because some algorithms and solutions to problems are expressed better recursively.



## Factorials

As an example, in mathematics the factorial of a number n (written as n!) is the product of that number and every positive integer below it. For instance, the factorial of five (5!) is equal to 5*4*3*2*1, or 120.

Consider this: 6! (the factorial of six) is equal to 6*5*4*3*2*1. Rather than calculating the entire sum, you can just multiply 6 by 5!, because both calculations have a common part.

Recursion is about solving problems using smaller versions of the same problem. For any given number (n) its factorial (n!) can be expressed as follows.

```
0! = 1
n! = n*(n-1)!
```

In Java, the recursive calculation of the factorial can be coded as follows.

```
public static int Factorial (int n)
{
  if (n == 0)

// Stopping case
   return 1;

  else

// Recursive call
   return n * Factorial (n - 1);
}
```

A recursive method contains a call to itself. In the method called Factorial() (above), there's a line of code in which the method Factorial() calls the method Factorial() — that is, it makes a call to itself.

Obviously, if the method calls itself, it could keep doing so forever, and never stop. A recursive method won't execute correctly unless it has at least one special case that causes the recursion to stop.

In the preceding method, this case is when the variable n is equal to the value 0, that is, when you wish to calculate 0!. This is known as the stopping case.

Recursion works in a computer program because each time the method executes, it is furnished with a unique and fresh copy of all its parameters and local variables. Each time the parameter n is passed in, it is new and unique for every call to the Factorial() method. Conversely, any global variables in your program are not unique to any part-icular instance of a method; altering their value changes them for the whole program.

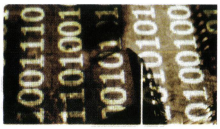
Most recursive methods, including our example, perform their calculation in the return cycle of the function call.

## Understanding recursion

To understand how a particular programming problem could have a recursive solution, you need to understand recursion. You need an even more sophisticated grasp of recursion to devise a recursive algorithm to solve a particular problem and then implement it in Java code.

To grasp recursion, you need to understand the call-return mechanism used by a programming language to access subprograms. In Java, this means visualising how methods are accessed and how execution returns from the method to the calling code. In the descriptions that follow, the term 'client' or 'client code' refers to the routine that makes the call.

The call-return mechanism is easy to follow where client code calls a method in the same class or in another class it has access to. In this case, the client references the



method's parameters in the call and receives an optional return value at the conclusion of the method's execution. Less obviously, the calling code must also pass to the method the address the execution is to return to. The return operation cannot be performed without this memory address.

## Elements of the call-return mechanism

The parameters and the return address that are passed to a method at call time are known as its activation record. Recursion is possible when a programming language maintains a unique activation record for every method iteration. One way to understand this is to imagine that when a method is called, the language creates a copy of the code and attaches to it the corresponding arguments and return address; in other words, it creates an activation record.

For example, suppose that the recursive method to calculate the factorial (listed previously) is called with an initial value of 3. In this case, client code passes its return address and the initial value n = 3 as the activation record for the first iteration of the Factorial() method.

The method then decrements the value of n so that n = 2, and calls Factorial() recursively. In this case, the activation record for the second iteration of Factorial() is the return address of the line that follows the call and the value n = 2.

Processing again decrements the value of n so that n = 1, and calls Factorial() for the third time. Once again, the activation record for the call is the address of the code line following the call and the value n = 1.

During the third call to the Factorial() method, the value of n is again decremented (n is now 0) and the method is called for the fourth time.

After the fourth iteration of the recursion, the value of n = 0. This means that the terminating condition has been met, and no further recursive calls will be made.

The recursion now starts unwinding from its most deeply nested iteration. It's during this unwinding process that the calculations are performed.

## Recursive solutions

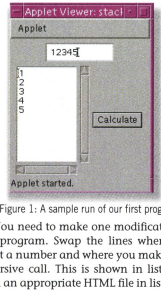
Many problems in mathematics, as well as in symbolic processing in general, can be expressed recursively. For example, the general expression of the exponential function can be expressed recursively.

if $y = 0$ then $x^y = 1$
else $x^y = x * x^{(y-1)}$

Other more common programming problems can often be solved using recursion. Consider the task of displaying the individual digits of an integer number in a vertical list. For example, the number 131,114 would be displayed as follows.

```
1
3
1
1
1
4
```

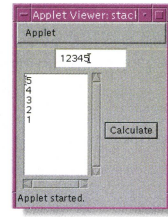
The first program in this month's code listings allows you to do this. The code can be found in listing 1, and an appropriate HTML file in listing 2. A sample run is shown in figure 1.




▲ Figure 1: A sample run of our first program

You need to make one modification to the program. Swap the lines where you print a number and where you make your recursive call. This is shown in listing 3, with an appropriate HTML file in listing 4. Your number is printed in reverse. Do you understand why?

Recursive routines usually do not improve code size or memory use. In fact, recursive versions of most algorithms execute slower than their iterative counterparts. However, recursion has a big advantage as a problem-solving tool.




▲ Figure 2: A sample run of our second program

Some sorting algorithms such as quicksort are difficult to describe or implement without using recursion. Complex reasoning problems that occur in artificial intelligence lend themselves to recursive solutions. Recursion is often used in processing lists of data. A list is defined as an ordered set of values, as in the following example.

[apples, oranges, bananas, grapes]

The first element (apples) is known as the head of the list. Recursion can be used to test whether a given element exists in the list. See the following steps.

- If the list is empty, then return false.
- If the head of the list is the element we are looking for, then return true.
- Else call the function again, with the rest of the list as the argument (drop off the head for this recursive call).

To recap, a recursive routine performs calculations by calling itself. Many common programming problems can be expressed and solved recursively. To grasp recursion you need to have a clear understanding of the call-return mechanism used by programming languages. Recursion is possible when a programming language maintains a record (called the activation record) of the data and the address of the calling code that is passed to each iteration of a called routine.

Recursive solutions are elegant and powerful, but they often take longer to run and use up more code than their iterative versions.

***David Williams***

David Williams can be contacted at dave@ged.newcastle.edu.au.

For a complete archive of *APC* Java columns, see apcmag.com.

# Java source code

**Listing 1: A program to print numbers in a vertical list**

```
import java.applet.*;
import java.awt.*;
import java.awt.event.*;

public class stack extends Applet implements ActionListener
{
  static private TextField theNumber;
  static private Button calculateBtn;
  static private TextArea theAnswer;

  public void init ()
  {
    theNumber = new TextField("", 10);
    theAnswer = new TextArea("", 10, 10);
    calculateBtn = new Button ("Calculate");
    calculateBtn.addActionListener (this);
    add (theNumber);
    add (theAnswer);
    add (calculateBtn);
  }

  public void actionPerformed (ActionEvent event)
  {
    theAnswer.setText ("");
    stackDigits (theNumber.getText ().trim ());
  }

  private static void stackDigits (String s)
  {
    if (s.equals (""))
      return;
    else
    {
      // Method calls itself
      theAnswer.setText (theAnswer.getText () + s.substring (0,1) + "\n");
      stackDigits (s.substring (1));
    }
  }
}
```

**Listing 2: An HTML page to call the applet above**

```
<html>
<head>
<title>Vertical Stack</title>
</head>

<body>
<applet code="stack.class" width="200" height="200"></applet>
</body>
</html>
```

**Listing 3: A program to reverse numbers and display them in a vertical list**

```
import java.applet.*;
import java.awt.*;
import java.awt.event.*;

public class stack2 extends Applet implements ActionListener
{
  static private TextField theNumber;
  static private Button calculateBtn;
  static private TextArea theAnswer;

  public void init ()
  {
    theNumber = new TextField("", 10);
    theAnswer = new TextArea("", 10, 10);
    calculateBtn = new Button ("Calculate");
    calculateBtn.addActionListener (this);
    add (theNumber);
    add (theAnswer);
    add (calculateBtn);
  }

  public void actionPerformed (ActionEvent event)
  {
    theAnswer.setText ("");
    stackDigits (theNumber.getText ().trim ());
  }

  private static void stackDigits (String s)
  {
    if (s.equals (""))
      return;
    else
    {
      // Method calls itself
      stackDigits (s.substring (1));
      theAnswer.setText (theAnswer.getText () + s.substring (0,1) + "\n");
    }
  }
}
```

**Listing 4: An HTML page to call the second applet**

```
<html>
<head>
<title>Reversed Vertical Stack</title>
</head>

<body>
<applet code="stack2.class" width="200"height="200"></applet>
</body>
</html>
```

**This listing can be found on this month's cover CD.**

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# PHP: Under the hood

This month, Insite takes a look at PHP. If you've programmed in Active Server Pages, ColdFusion, JavaScript, Perl or C, you should follow it without too much trouble. If you are unfamiliar with server programming, have a look at some of the tutorials and links provided in the box below.

## PHP resources online

**PHP distributions**
www.php.net

**PHP manuals**
php.net/docs.php

**PHP FAQ**
php.net/FAQ.php

**Setting up PHP, mySQL and Apache**
www.devshed.com/Server_Side/PHP/SoothinglySeamless

**PHP tutorials**
www.gimpster.com/php/tutorial

www.phphelp.com/tutorial/introducing-php.html

www.devshed.com/Server_Side/PHP/PHP101_1

vsbabu.csoft.net/zope/6tutorials/php

www.builder.com/Programming/PHPIntro/ss01.html

**PHP dynamic graphics library for Windows**
php.weblogs.com/GD

**PHP dynamic graphics library for Linux**
www.boutell.com/gd

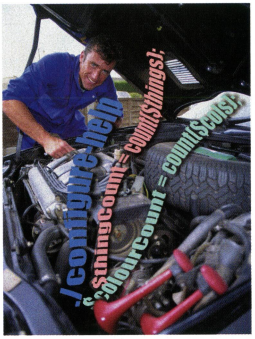
**PHP general resources**
php.resourceindex.com
www.zend.com
www.phpwizard.net
px.sklar.com
www.phpbuilder.com

**Apache for Windows**
www.apache.org/dist/binaries/win32

**Apache for Linux**
www.apache.org/dist/binaries/linux

## About PHP

PHP is a server-side scripting language, or HTML preprocessor. Because it runs on the Web server and not in the browser, it can be used to perform a variety of dynamic functions such as connecting to databases, parsing text files, making network connections, and even generating graphics in real time. PHP is free and distributions are available for Linux and Windows systems. It runs as a module for Apache Web servers, but it can also be used as a standard CGI application, or as an ISAPI or NSAPI plug-in for Microsoft or Netscape servers.




## Install PHP under Windows

The Windows PHP installer (see this month's cover CD) asks you to specify the type of Web server you are running and then automatically configures itself. To use PHP's dynamic graphic capabilities (the subject of next month's column), you need to unzip the contents of php_gd_gif.zip (see this month's cover CD) to your PHP program directory.

Next you need to edit your C:\windows\php.ini file. First, find the line containing extension_dir= and change it to reflect the full path to where you installed PHP.

```
extension_dir="C:\Program Files\php"
```

Then find the list of Windows Extensions and add the following line.

```
extension=php_gd_gif.dll
```

## Install PHP under Linux

The Linux PHP installer requires some manual configuration after you decompress the distribution file. First, change to the directory you put the PHP files in and type the following.

```
./configure --help
```

This lists all the configuration options. If you intend to use the dynamic image generation (covered in next month's Insite), enable the graphics library (gd) by typing the following.

```
-gd=[/path/to/gd]
```

To finish the installation, modify your httpd.conf or srm.conf file and restart the server. Also add the following line.

```
AddType application/x-httpd-php .php
```

## Get started

If you are having trouble installing PHP, check the FAQ at php.net and the PHP manual (see this month's cover CD). To check that your installation is successful, put the code from listing 1 in a new file on your site and save it as test.php. You should now be able to browse to your.server.name/test.php and see the words 'PHP installation was successful!'.

If you are familiar with Perl, JavaScript, C++ or Active Server Pages, you'll recognise what is happening in the test.php page, but the syntax may be a little unfamiliar. Everything between the delimiters is PHP code and is interpreted by the PHP engine. Everything outside these markers is ignored by PHP and returned by the server as regular HTML. Listing 1 defines a variable called $testText and sets its value to 'PHP installation was successful!'. This

variable is sent to the browser using the PHP print command.

There are a few things to bear in mind when considering PHP programming structures, particularly if you are used to working with Active Server Pages.

- Sections of PHP code are defined with <? and ?> tags (or <?php and ?> tags).
- PHP variable names need to be prefixed with a dollar sign ($).
- To use quotation marks or dollar signs inside a string, prefix them with a backward slash (\$ or \").
- PHP variables are case sensitive, so $myvar is not the same as $myVar.
- Single-line comments are prefixed with a double forward slash (//).
- String concatenation is performed with a dot (.). Ampersands (&) and plus signs (+) do not work.

## Operators

When constructing If...Else statements and assigning values to your variables, use the following operators. Most of these are standard across programming languages.

### Arithmetic and string operators

$a + $b : addition
$a - $b : subtraction
$a * $b : multiplication
$a / $b : division
$a % $b : modulus (remainder)
$a . $b : string concatenation

### Logical operators

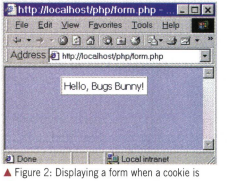
$a || $b : Or
$a or $b : Or
$a && $b : And
$a and $b : And
$a xor $b : Xor. (True if either $a or $b is true, but not if both are true)
! $a : Not

### Comparison operators

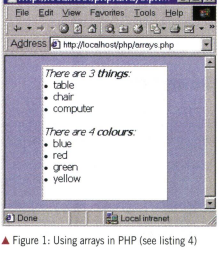
$a == $b : Equality
$a != $b : Not equal
$a < $b : Less than
$a <= $b : Less than or equal to
$a > $b : Greater than
$a >= $b : Greater than or equal to

## Conditional statements and loops

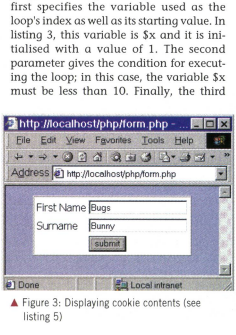
If...Else statements in PHP are syntactically the same as those in C or JavaScript and use the format shown in listing 2. There are three main looping constructs in PHP: the For loop, the Do...While loop, and the While loop. These are all demonstrated in listing 3. The For loop might confuse those unfamiliar with C languages as it accepts three parameters. The first specifies the variable used as the loop's index as well as its starting value. In listing 3, this variable is $x and it is initialised with a value of 1. The second parameter gives the condition for executing the loop; in this case, the variable $x must be less than 10. Finally, the third parameter ($x++) indicates that the variable $x is to be incremented with each iteration of the loop after it has completed.




▲ Figure 2: Displaying a form when a cookie is absent (see listing 5)




▲ Figure 1: Using arrays in PHP (see listing 4)




▲ Figure 3: Displaying cookie contents (see listing 5)

## Variables

Working with variables in PHP is in many ways easier than in languages such as ASP or ColdFusion. Because all variables are prefixed with a dollar sign ($), they can be inserted into a string without breaking the programming flow. For example, compare the following pieces of code.

### ColdFusion

```
<CFSET myVar = 11>
<CFOUTPUT>
My Variable is #myVar#
</CFOUTPUT>
```

### Active Server Pages

```
<%
myVar = 11
response.write("My Variable is" & myVar )
%>
```

### PHP

```
<?
$myVar = 11;
print "My Variable is $myVar";
?>
```

Also, in PHP there is no distinction between local, querystring, form and cookie variables. Instead, the variable name is used regardless of what type of variable it is. This is similar to using the request.item() function in ASP. It can make form handling particularly easy, but you must be very careful when naming your variables. Use a naming convention such as vVariable, qVariable, fVariable, cVariable, to distinguish local, querystring, form and cookie variables in your code.

## Arrays

Arrays are initialised using square brackets [] or the built-in array() function. The number of elements in an array can be determined using the count() function. A simple example of using an array is given in listing 4.

## Form processing

Listing 5 shows an example of form processing. The third line uses the function isSet(), which determines whether a variable has been initialised

# Insite source code

**Listing 1: A test PHP page**

```
<html><body>
<?
// create a variable called $testText
$testText = "PHP installation was successful!";

//write the variable to the browser
print $testText
?>
</body></html>
```

**Listing 2: A conditional statement**

```
<?
if ($number == 1) {
   print "the number is 1";
} elseif ($number == 2) {
   print "the number is 2";
} else {
   print "the number is not 1 or 2";
}
?>
```

**Listing 3: Looping in PHP**

```
<?
// A For loop
for ($x = 1; $x < 10; $x++) {
   // do something
}

//initialise $x
$x = 1

// A Do...While loop
do {
   // do something
   $x = $x + 1
} while ($x < 10);


//re-initialise $x
$x = 1

// A While loop
while ($x < 10) {
   // do something
   $x = $x + 1
}
?>
```

**Listing 4: Working with arrays**

```
<?
$cols = array("blue","red","green","yellow");
$things[0] = "table";
$things[1] = "chair";
$things[2] = "computer";

$thingCount = count($things);
$colourCount = count($cols);

print "There are $thingCount things:<br>";
foreach ($things as $thing){
        print "<li>$thing<br>";
}

print "There are $colourCount colours:<br>";
foreach ($cols as $colour){
        print "<li>$colour<br>";
}
?>
```

**Listing 5: Form processing**

```
<?
$login = 0;

if (isset($firstname) && isset($surname)){
 if ($firstname != "" && $surname != ""){
        setcookie("name", "$firstname $surname");
        print "Hello, $firstname $surname!";
        $login = 1;
 }
}

if ($login == 0){
 print "<form action=\"$PHP_SELF\" method=\"post\">";
 print "First Name<input type=\"text\" name=\"firstname\"><br>";
 print "Surname<input type=\"text\" name=\"surname\"><br>";
 print "    <input type=\"submit\" value=\"submit\">";
 exit;
}
?>
```

For the complete code for all the pages used here, check this month's cover CD.

or not. If the $surname and $firstname variables are not set, the page displays a basic HTML form requesting the user's first and last names. However, if $surname is set, the code sets a cookie called 'name' with a string value comprising the two form fields ($firstname and $surname) separated by a space. It then prints the value of the $surname and $firstname variables to the browser. SetCookie() is a built-in function. To delete a cookie, set its value to null. The form also uses a system variable $PHP_SELF, which is always set to the name of the current PHP document. This is particularly useful for code that appears on multiple pages or in server side includes.

## The next step

Next month, Insite looks at using the graphics library features to create images dynamically on the server. The basics covered here and the resources listed in the box on page 142 will help you follow next month's topic.

*Daniel Potts*

For a complete archive of *APC* Insite columns, see apcmag.com.

Daniel Potts can be contacted at daniel@indigointeractive.com.au

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## Index


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**PCs/Notebooks/Servers**
Toshiba Notebooks 4-7
Compaq Computers 8-9
Compucon 10-11
Acer 12
HP Servers/Networking 16
HP Desktops 17
Quantum SnapServer 21
Palm Computers 22-23

**Mice, Keyboards**
Logitech 33
Microsoft Hardware 62

**Back-up & Networking**
SonicWall 20
APC 24
Targus 25
Netgear 26-27
Xircom 28
Dlink 29
Comsol Cables 34
Belkin Cables 41

**Modems/Fax Machines**
3Com 31
Netcomm 32

**Storage**
SCSI 18
Maxtor 19
Imation 19
Digital Tape 35
Iomega 36
Verbatim 38-40
Eiger 41
HP CDRW 45

**Add-on Cards**
New Magic 37
Matrox 59

**Monitors & Multimedia**
Sony 13-15
Intel Cameras 30
Kodak 42
Sharp 50
Hitachi 51

**Printers, Scanners**
Canon 43
HP ScanJets 44
HP OfficeJet & DeskJet 45
HP LaserJet & InkJet 46
AGFA 47
Epson 48
Fuji Xerox 49

**Software Applications**
Microsoft Windows 3
Macromedia 52
Autodesk 53
Adobe 54-55
Micrografx 56
Pixel 57
MYOB 57
Symantec 58
DTMS 59
Seagate 60
Computer Associates 61
Interact 62
Microsoft Office 63


**Catalogue valid from 01/03/01 to 31/03/01**

## Showroom and Store Locations

### HQ - North Ryde

**Open 7am - 7pm Monday - Friday**
**9am - 4pm Saturday & Sunday**

45 Epping Road, Cnr Epping & Wicks Rd
North Ryde, NSW 2113 (Close to Microsoft)

**Sales:**
**(02) 8879 5095**
**Showroom:**
**(02) 8879 5130**
**Reception:**
**(02) 8879 5000**
**Fax:**
**(02) 8879 4000**



### North Sydney

**Open 9am - 5:30pm Monday - Friday**
**9am - 4pm Saturday & Sunday**

Ground floor, Bayer Building, 275 Alfred
Street North, North Sydney, NSW 2060

**Showroom:**
**(02) 8879 5135**
**Cust.Service:**
**(02) 8879 5140**
**Fax:**
**(02) 8879 5137**



### Melbourne

**Open 9am - 5:30pm Monday - Friday**
**9am - 4pm Saturday & Sunday**

212 Hoddle Street
Abbotsford
VIC 3067

**Sales:**
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**Fax:**
**(03) 9418 4105**



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- *Fast & Friendly Customer Service!*
- *Product Information*
- *Stock availability*
- *Your order status*
- *Pricing*



### Target

HARRIS TECHNOLOGY @ Target.

**BALLARAT EAST:**
Doveton St South, VIC 3350
**Phone: (03) 5327 4050**
**CAMBERWELL:**
Station St, VIC 3124
**Phone: (03) 9934 6600**
**EPPING:**
Epping Plaza Shop - Cnr High St
& Cooper St, VIC 3076
**Phone: (03) 9408 8500**

### Kmart

HARRIS TECHNOLOGY @ Kmart

**BROADWAY:**
Broadway Shopping Centre,
Cnr Bay & Grose Streets
NSW 2007
**Phone: (02) 9219 7319**
**BURWOOD:**
Cnr Burwood Highway &
Blackburn Rd, VIC 3151
**Phone: (03) 9210 0732**

**Kmart and Target Shoppers!** Not all products are in-store, but consulting & advice available on all items

## Ordering



**For all locations:**
**Phone, fax, drop into one of our locations or order online through our website.**

## Contact Details



| | |
|---|---|
| **Sales** | **1300 13 9999** |
| **Facsimile** | **1300 13 6666** |
| **Email** | **info@ht.com.au** |
| **Customer Service** | **1300 13 8888** |
| **Main Reception** | **1300 13 5555** |

## Delivery



**We deliver Australia Wide!**

Delivery times quoted by sales staff are our best estimates based on information received from the manufacturers. These estimates are offered as a guide only.

| | |
|---|---|
| Under **3Kg:** | **$9.90** |
| **3Kg - 10Kg** (e.g printer): | **$16.50** |
| Over **10Kg** (e.g. system): | **$33.00** |

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***Look out for bonus offers in this catalogue.***
Collect 1 standard point for every $5 spent.

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1901-2001 Centenary of Federation National Centenary Proje

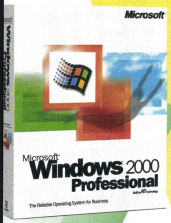
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## Better Living in the Digital World

### Windows® 2000 Professional




***Microsoft Operating System for Business:*** The next generation of NT workstation for the desktop. Built on Windows NT® technology and an easy-to-use, familiar Windows® 98 user interface, Windows 2000 Professional makes business users more productive. Its integrated Web capabilities and broad support for mobile computers and hardware devices makes Windows 2000 the easy way for business users to connect to the Internet anywhere and anytime. And its rock-solid reliability and improved manageability simplify desktop management for IT Professionals.

- The best way to Internet-enable your business using integrated Web application services, increased scalability and industry-standard security.
- A more reliable platform designed for increased system uptime.
- A more manageable operating system to lower desktop management costs.
- Will enable knowledge workers to be more productive and take advantage of new devices.

**Version Upgrade from Windows NT WorkStation** (88594) GST INC: **$278**

**Product Upgrade fromWindows 95/98** (88593) GST INC: **$409**

**Full Version** (88592) GST INC: **$585**

FLY BUYS 500 BONUS POINTS

Microsoft Office 2000 SEE PAGE 63 FOR MORE INFORMATION



### Microsoft Windows Me Millennium Edition

**For Home**

The Best in Digital Media
Improved User Experience
Enhanced Home Networking

### Microsoft Windows 2000

**For Business**

Internet Enable your Business
Reliable, Manageable
Best for New Business Devices

### Windows® Millenium Edition

***The new Microsoft Operating System for home use***

*System Restores* lets you easily return your system to a working state in the event of a significant problem, so you can quickly get back to using your PC.

With *Windows Image Acquisition*, you can easily import photos from scanners and cameras. No extra software is required to perform simple operations like previewing, rotating and printing.

*Microsoft Movie Maker* gives you the power to create, edit and share movies over the Internet.

*Windows Me* includes built-in safeguards that help prevent you (or applications) from deleting or overwriting key system files.

Internet Explorer 5.5 provides the richest online experience with easy search capabilities, faster browsing and easier printing.

*Windows Me* is ready for home networking. You can easily set up a home network through your PC, and share printers, Internet connections and other devices.

FLY BUYS 500 BONUS POINTS

**Windows® Millenium Edition Upgrade** (A3687) GST INC: **$165**







**Windows® Millenium Edition Full Version** (A3686) GST INC: **$319**

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FLY BUYS 500 BONUS POINTS

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* No further discounts apply

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**Order On-line** www.ht.com.au

# TOSHIBA

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## Compare Tecra Models

Ask about... Extended Harris Technology Warranty

**TOSHIBA ACCESSORIES**

**TOSHIBA Battery Charger**
For for Tecra (90056)
GST INC
**$514**

**TOSHIBA A4 Leather Bag**
(68408) GST INC
**$229**

**TOSHIBA USB 18-key Numeric Pad**
For Satelite Series (A3773)
GST INC
**$95**

**TOSHIBA Universal AC Adapter**
For Tecra 8000/Satellite 4000/4010 & others (44200)
GST INC
**$104**

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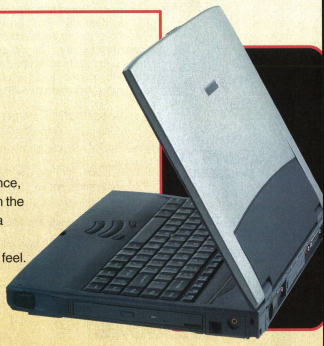
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MAR 4

### Tecra 8100

- Pentium III 600MHz SS
- 14.1" TFT
- 64MB RAM
- 12GB HDD
- 6 x DVD
- 3 Year Warranty

Styled for consistant mobile performance, the Tecra 8100 series provides you with the ultimate combination of traditional Tecra investment benefits, high processor performance and a new sleek look and feel.



(94185) GST INC

**$4,195**

Rent for $48.30

### Tecra 8100 Range

| | Tecra 8100 | Tecra 8100 | Tecra 8100 | Tecra 8100 |
|---|---|---|---|---|
| Processor | Pentium III 600MHzSS# | Pentium III 700MHzSS# | Pentium III 750MHzSS# | Pentium III 850MHzSS# |
| RAM Std/Max | 64 MB | 128 MB | 128 MB | 128 MB |
| Hard Disk | 12GB | 12GB | 20GB | 20GB |
| Screen | 14.1" TFT | 14.1" TFT | 14.1" TFT | 14.1" TFT |
| CD-ROM | 24x CD-ROM | 24x CD-ROM | No | No |
| Mic & Spkr | Speakers | Speakers | Speakers | Speakers |
| Port replicator | Optional | Optional | Optional | Optional |
| Select bay | Yes | Yes | Yes | Yes |
| DVD capable | 6 x DVD | 6 x DVD | 6 x DVD | 6 x DVD |
| Weight | 2.8 kg | 2.8 kg | 2.8 kg | 2.8 kg |
| Warranty | 3 Years | 3 Years | 3 Years | 3 Years |
| 56K V.90 modem | Yes | Yes | Yes | Yes |
| **RENT*** | **$48.30** | **$55.51** | **$59.22** | **$69.15** |
| **GST INC** With Windows 95/98 | **$4,195** (94185) | **$6,090** (A2868) | **$6,825** (A2863) | **$7,426** (B0084) |
| **RENT*** | **$50.12** | **$59.85** | **$65.32** | **$70.41** |
| **GST INC** With Windows 2000/NT4 | **$5,144** (94186) | **$6,334** (A2869) | **$7,529** (A2864) | **$7,572** (B0085) |

HARRIS TECHNOLOGY

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# TOSHIBA

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## Compare Portege Models

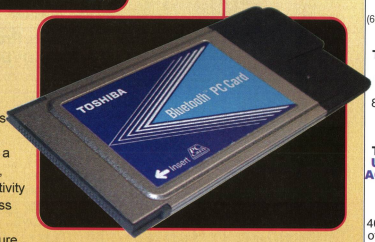
### Portege 3400CT



The Portégé® 3480CT is the ultimate statement in mobile computing with its Pentium® III power, large high resolution colour display, long battery life and easy functionality all packed into an ultra thin lightweight body finished in sleek magnesium. With head turning style and work burning performance, the Portégé® 3480CT is the perfect tool for the travelling executive ready to succeed in the new world.

| | Portégé 3480CT | Portégé 7220CTe |
|---|---|---|
| Processor | PIII 600MHz | PIII 650MHz |
| RAM Std/Max | 64/192 MB | 64/192 MB |
| Hard Disk | 12GB | 12GB |
| Screen | 11.3" TFT | 13.3" TFT |
| Display | 1024x768 | 1024x768 |
| CD-ROM | Optional | Optional |
| Mic & Spkr | Yes | Yes |
| Port replicator | Optional | Optional |
| Select bay | No | No |
| LAN | Yes | Optional |
| DVD capable | Yes | Yes |
| Weight | 1.6 kg | 2 kg |
| Warranty | 3 Years | 3 Years |
| *56K V.90 modem* | Yes | Yes |
| RENT* | $45.65 | $54.43 |
| GST INC With Windows 95/98 | $4,569 (A5779) | $4,195 (A2839) |
| RENT* | | $46.47 |
| GST INC Windows 2000/NT4 | (N/A) | $5,099 (A7020) |

### Blue Tooth Technology




## Toshiba Brings First Bluetooth PC Card Solution to Market

Toshiba's wireless solution empowers portable computer users to unplug from the restraints of conventional wired computing with a fully integrated Bluetooth PC Card, complete with SPANworks productivity software. Using short-range wireless radio communication, Bluetooth technology facilitates fast and secure transmission of both voice and data at speeds of up to 1 Mbit/s, which is up to 20 times faster than a standard V.90 modem connection. Utilising this revolutionary wireless technology, Toshiba's Bluetooth PC Card can be used to connect portable computers, printers, digital mobile phones, PDAs, digital cameras, network access points and other mobile devices to one another and connect to the Internet or a LAN without the need for wires or cables.

(B6572) GST Inc **$355**

### TOSHIBA ACCESSORIES

**TOSHIBA Slimline Battery Packs**
For Portege 7140/ 7220CTe (92963) GST INC **$125**
For Portégé 3010/3020 (Lithium Ion) (73665) GST INC **$180**
For Satellite 4000 Series (72109) GST INC **$118**
For Tecra 8000 (Lithium Ion) (29358) GST INC **$240**

**TOSHIBA High Capacity Battery Packs**
For Portégé 3010/3020 (72475) GST INC **$240**
For Portégé 7000/7020 (66479) GST INC **$285**

**TOSHIBA Battery Charger**
For Tecra 8000 (29357) GST INC **$209**

**TOSHIBA Universal AC Adapter**
For Tecra 8000/ Satellite 4000/4010 & others (44200) GST INC **$104**

MAR 5

# TOSHIBA

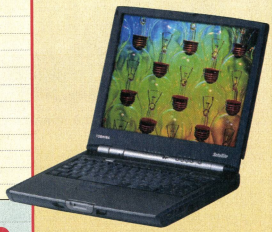
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## Compare Satellite Pro Models

### Satellite 30CDT

The Satellite series is the ideal notebook for small and medium business, corporate projects and consumers providing the most CPU/Dollar from a major vendor without compromising features. This Satellite features a Celeron 500MHz CPU, 64MB Ram, 10GB Hard Disk, Windows® ME, 12.1" Active Matrix TFT Screen, 56KB Modem in an all new case.

| | |
|---|---|
| Processor | Celeron 500MHz |
| RAM Std/Max | 64/192 MB |
| Hard Disk | 10GB |
| Screen | 12.1" TFT |
| CD-ROM | 24xCD-ROM |
| Mic & Spkr | Speakers |
| Port replicator | No |
| Select bay | No |
| DVD capable | No |
| Weight | 2 kg |
| Warranty | 1 Year |
| 56K v.90 modem | Yes |
| **RENT*** | **$35.88** |
| **GST INC** (B2350) | **$3,659** |



Ask about...

EXTENDED HARRIS TECHNOLOGY WARRANTY

- ☐ Extend to a total of 3 Years Return to Base
- ☐ Extend to a total of 5 Years Return to Base
- ☐ Upgrade Return to Base to On-Site

RENTSMART

$200 VOUCHER Rent Rentsmart

SEE PAGE 64 FOR DETAILS

The figures quoted are based on a per week basis over 3 years. To approved persons, Terms and Conditions apply.

### Satellite Pro Range

| | Satellite Pro 4310XCDT | Satellite Pro 4340XDVD | Satellite Pro 4360XDVD | Satellite Pro 4380XDVD |
|---|---|---|---|---|
| Processor | Celeron 600MHz | Pentium III 650MHzSS# | Pentium III 700MHzSS# | Pentium III 750MHzSS# |
| RAM Std/Max | 64/320 MB | 64/320 MB | 64/320 MB | 64/320 MB |
| Hard Disk | 6GB | 12GB | 12GB | 12GB |
| Monitor | 13.3" TFT | 14.1" TFT | 14.1" TFT | 14.1" TFT |
| CD-ROM | 24xCD-ROM | DVD | DVD | DVD |
| Mic & Spkr | Yes | Yes | Yes | Yes |
| Port replicator | Optional | Optional | Optional | Optional |
| Video Ram | 8Mb | 8Mb | 8Mb | 8Mb |
| DVD capable | No | Inc 6xDVD | Inc 6xDVD | Inc 6xDVD |
| Weight | 3.17 kg | 3.17 kg | 3.17 kg | 3.17 kg |
| Warranty | 1 Year | 1 Year | 1 Year | 1 Year |
| 56K V.90 modem | Yes | Yes | Yes | Yes |
| **RENT*** | **$35.11** | **$45.09** | **$42.19** | **$45.79** |
| **GST INC** | (A2855) **$3,580** | (B2354) **$4,825** | (A2995) **$4,515** | (A2857) **$4,900** |

MAR 6

HARRIS TECHNOLOGY™

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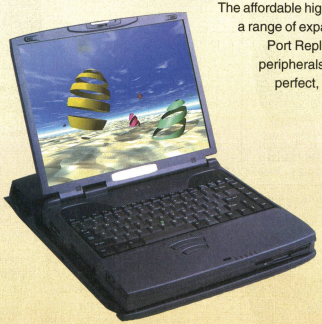
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# TOSHIBA

Web Direct www.ht.com.au/cat/toshiba

## Compare Satellite Pro Models

### Satellite Pro 4310



The affordable high performance mobile computer. With a range of expansion capabilities, including optional Port Replicator for easy connection to desktop peripherals and accessories, Satellite Pro is the perfect, no-compromise solution for business professionals.

* Intel Celeron 600MHz
* 64Mb / 320Mb SDRAM
* 6Gb HDD
* 8MB Video Ram
* Internal Modem 56K
* 13.3"TFT
* CD Drive
* Windows 98 Second Edition
* RCA Out

(A2854) GST INC

**$2,295**

Rent for $29.37

Ask about...

EXTENDED HARRIS TECHNOLOGY WARRANTY

- ☐ Extend to a total of 3 Years Return to Base
- ☐ Extend to a total of 5 Years Return to Base
- ☐ Upgrade Return to Base to On-Site

### Satellite 4600

The Satellite Pro 4600 puts the latest performance, multimedia, storage and display technologies within reach. With a number of configurations to choose from, the Satellite Pro Series lets you pick and choose which technologies are right for you.



* Pentium III SpeedStep 650MHz
* 64Mb / 320Mb SDRAM
* 10GB EIDE HDD
* 10/100 BaseTX Ethernet
* 56K V.90 Data & fax modem
* Int 8X DVD-ROM
* 14.1" TFT display
* Windows 98 Second Edition

(B6271) GST Inc

**$4,588**

Rent for $42.88

RENTSMART

$200 VOUCHER Rent Rentsmart

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**Website:** www.ht.com.au
**E-mail:** sales@ht.com.au

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# COMPAQ

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HARRIS TECHNOLOGY™ for all your computer needs!

RENTSMART

SEE PAGE 64 FOR MORE DETAILS

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### ARMADA E500 NOTEBOOK

Value, expandability and performance! The Armada E500 notebook provides the all-in-one solution that will meet your individual needs.

- Mobile Intel Celeron 600MHz processor
- 13.3" Colour TFT XGA display
- 64MB SDRAM + BONUS 64MB Free
- 5GB Hard Disk Drive
- 24X Max CD-ROM
- Integrated modem and 10/100 ethernet
- Microsoft Windows 98 SE
- 1 year pick-up warranty with 48-hour service workshop turnaround repair time



**+ 64MB FREE MEMORY!***

*Offer ends 31 March 2001

(B1928) GST Inc **$3,489** RentSmart $34.21 / week

### ARMADA M700 NOTEBOOK

For exceptional performance in a thin and light form factor, the Armad M700 notebook has all the power you need.

- Mobile Intel Pentium III 750MHz processor
- 14.1" Colour TFT XGA Display
- 128MB SDRAM
- 12GB Hard Disk Drive
- 8X DVD-ROM Drive
- Integrated Modem and 10/100 Ethernet
- Microsoft Windows NT/2000 dual install
- 3 year pick-up warranty with 48-hour service workshop turnaround repair time



(A4236) GST Inc **$6,299** RentSmart $57.41 / week

### iPAQ POCKET PC H3130 MONO

Affordable technology that enables users to store business critical information when they need it most.

- 206MHz Intel StrongARM 32-bit RISC processor
- Display 59.6mm wide x 78.8mm tall
- 15 gray-scale STN LCD touch screen
- 16MB RAM, 16MB Flash ROM
- Handwriting recognition, soft keyboard, voice recorder, inking
- 950 mAh Lithium polymer battery, up to 14 hours
- 163.5 grams, including battery



FLY BUYS 4,000 BONUS POINTS

(B4505) GST Inc **$875** RentSmart $9.59 / week

### iPAQ POCKET PC H3630 COLOU

First class technology that enables users to store business critical information when they need it most.

- 206MHz Intel StrongARM 32-bit RISC processor
- Display 59.6mm wide x 78.8mm tall
- Super bright 12-bit TFT display with 4,096 colours and reflective technology
- 32MB RAM, 16MB Flash ROM
- Handwriting recognition, soft keyboard, voice recorder, inking
- 950 mAh Lithium Polymer with up to 10-hour battery life
- 170 grams, including battery



FLY BUYS 4,000 BONUS POINTS

(A3737) GST Inc **$1,149** RentSmart $12.59 / week

FLY BUYS 4,000 BONUS POINTS

**Collect 1,000 Bonus Fly Buys points when you purchase B4505, or A3737 between 20/02/01-31/03/01**

MAR 8

### MP1400 MICROPORTABLE PROJECTOR

- Native SVGA (800x600) display
- Plug & Play features, AutoSync technology
- Displays video from a VGA or DFP source
- Optional multimedia adapter with Premier Sound speaker and remote control
- Texas Instruments Digital Light Processing (DLP) technology
- Weighs only 1.9kg
- Two-year world-wide limited warranty



(A5430) GST Inc **$5,965** RentSmart $54.37 / week

### MP1800 MICROPORTABLE PROJECTOR

- Native XGA (1024x768) display
- Plug & Play features, AutoSync technology
- Displays video from a VGA or DFP source
- Full featured remote control with remote mouse and laser pointer
- 8-watt Premier Sound speaker system included in multimedia adapter
- Texas Instruments Digital Light Processing (DLP) technology
- Weighs only 2.09kg
- Two-year world-wide limited warranty



(B2973) GST Inc **$9,223** RentSmart $78.75 / week

HARRIS TECHNOLOGY™

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# There is a Compaq server perfect for your business

## THE WORLD'S MOST POPULAR SERVERS ARE NOW AVAILABLE AT SMALL BUSINESS PRICES.

### NeoServer 150

***This is an all-in-one, ready to go server. It provides a growing business with a quick, easy and cost-effective network.***

- No additional operating system required
- File and peripheral sharing
- Automated removable data back-up
- Shared internet access
- Internal company website
- Built-in secure firewall
- Supports up to 100 users

(A0268) GST Inc

**$Call**

| | |
|---|---|
| Processor | Celeron |
| Speed | 500 Hz |
| RAM | 64 MB |
| Hard Disk | 13 GB |
| Monitor | Not req. |
| Modem | 56 K |
| Op. System | Provided |



**Compaq NeoServer Installation Carepaq only an additional** (B6802) GST Inc

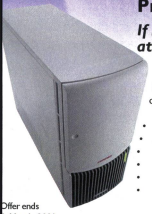
**$399*** **Special Price!!!**

*Terms & Conditions apply

### ProLiant ML 330

***If it is more power that you need, then take a look at the Compaq ProLiant ML 330***

+ **FREE 64MB RAM!***



Designed to meet the growing needs of small and medium businesses, delivering leading file/print to Internet technology, the ProLiant ML 330 offers high performance, quality and reliability at a low price! You can even manage this server from another location.

- Intel Pentium III 733MHz processor with 133MHz front side bus
- 64MB ECC SD RAM (expandable to 2GB)
- 9.1GB Wide-Ultra SCSI hard drive (hold up to 5 drives)
- 6 available PCI expansion slots
- Includes network controller, video card and renown insight manager software
- 3 year on site, next business day Compaq warranty

Offer ends 1 March 2001

(A4913) GST Inc

**$2,805**

**Web Direct**

See Web Direct Link (at top of page) for more products and latest info!

### ProLiant ML 350

***The Small Business server with the performance of a corporate, with hot-pluggable drive and dual processor options.***

The Proliant ML 350 is perfect for the small and medium businesses looking for constant uptime and a robust server to meet their growing needs. The ML 350 is surprisingly affordable and is expansive for corporate workgroup, file/print, Internet, e-mail, data backup, and a wide range of application and performance needs.



- Dual capable Intel Pentium III 866MHz processor with 133MHz front side bus
- 128 MB ECC SDRAM (expandable to 2 GB)
- 9.1GB Wide-Ultra SCSI hard drive (expandable up to 218GB)
- 6 available PCI expansion slots
- Includes network controller, video card and renown insight manager software
- 3 year on site, next business day Compaq warranty

It's the smart server for small business. Built-in pre-failure warranty on hard drives, processors, and memory mean the server detects any failing parts before your server goes down. Compaq will then immediately ship the parts required for your piece of mind.

(A4137) GST Inc

**$3,820**

Technology Partner COMPAQ

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MAR 9

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# COMPUCON

Web Direct www.ht.com.au/cat/compucon

## Enjoy a world of difference with Compucon

### AMAZE N700 Value System

COMPUCON

- Intel Celeron 700 Mhz Cpu with 128K Cache
- MSI-6178M mATX i810 Board with CODEC video and sound
- 64MB PC133 SDRAM, 8ns
- 10.2Gb Ultra ATA 100 ST310211A Hdd
- Compucon 3401 Micro ATX Case
- Teac 1.44MB Floppy Drive
- Sony 48X IDE CD-Rom Drive
- Compucon PS2 Internet Keyboard
- Compucon PS/2 Scroll Button Mouse
- 3 Years On-Site Warranty (4-8Hrs Response Time)
- Microsoft Windows
- Millenium Edition CD OEM
- Netcomm 56K Fax/Modem Internal

Upgrade to 128Mb Sdram PC133 add **$66** GST Inc
Compucon 15" Multimedia Monitor add **$330** GST Inc
Compucon 17" Multimedia Monitor add **$430** GST Inc
Compucon 19" Multimedia Monitor add **$720** GST Inc



**LOTUS SMARTSUITE — Millenium Edition v9:**

- Lotus 1-2-3
- Lotus Fastsite
- Lotus Word Pro
- Lotus Organizer
- Lotus Freelance Graphics
- Lotus Approach
- Lotus ScreenCam
- Lotus SmartCenter

**Plus:**

- Webster's World Encyclopedia 2001
- Encyclopedia of Australian Birds
- Encyclopedia of Australian Mammals
- History of Australian Sport

Rent 3 Yrs** **$15.55** (B6795) GST Inc

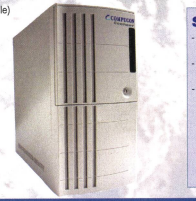
**$1,149**

Monitor Not Included in Price

### Centaur M866 Graphics Workstation

COMPUCON

- Pentium III 866Mhz Coppermine Cpu/256K cache (single)
- Pentium III Dual capable motherboard, VIA 694D Pro Chipset, 133Mhz FSB
- 4 Ultra DMA 100 + 4 Ultra DMA 33/66 (can connect up to 8 IDE devices)
- 64MB PC133 SDRAM
- 20.4GB Ultra DMA 100 IDE Hard Drive,7200RPM
- 32MB Leadtek S325 Riva TNT M64 AGP graphics card
- Compucon Centaur Case with 2 cooling fans
- 1.44MB Floppy Drive
- 48X IDE CD-Rom Drive
- Compucon Keyboard PS/2
- Compucon Mouse PS/2
- 10/100MB PCI Network Card with WOL



**SYSTEM ALSO INCLUDES:**

- Integrated Sound Blaster/ Direct Sound AC97 Audio
- MS Windows 2000 Professional on CD-Rom, preinstalled
- 3 Years On-Site Warranty

Rent 3 Yrs** **$23.78** (B6799) GST Inc

**$2,425**

Monitor Not Included in Price

### Atlantis Gaming Machine

COMPUCON

- AMD AthlonThunderbird Socket A 1000Mhz 200Mhz FSB CPU
- MSI-6340 FC-PGA VIA Chipset mATX MotherBoard 133Mhz FSB
- 256MB PC133 SDRAM 168Pin
- 20.4GB IDE Ultra ATA 100, 7200Rpm Hdd
- Leadtek GeForce-2 MX 256 32Mb Video Card 2X/4X AGP
- Compucon Atlantis iGrey ATX Case
- 1.44MB Floppy Drive
- 32/8X/4X IDE CD-RW drive with Software
- Compucon PS2 Multifunction Internet Keyboard
- Compucon PS/2 Scroll Button Mouse
- Compucon 17" Multimedia Monitor with 0.25dp
- Creative SoundBlaster Live Value Sound Card
- 3 Years On-Site Warranty
- Microsoft Windows Millenium Edition CD OEM
- Netcomm 56K Fax/Modem Internal



**GAMES SOFTWARE INCLUDES:**

- Games include: Age Of Empires II (The Age of Kings), Midtown Madness 2, Microsoft Golf 2001 Edition



Rent 3 Yrs** **$27.35** (B6794) GST Inc

**$2,789**

**Wine on-line?**

VINTAGE CELLARS

vintagecellars.com.au

*Ask about...*

EXTENDED HARRIS TECHNOLOGY WARRANTY

- ☐ Extend to a total of 3 Years Return to Base
- ☐ Extend to a total of 5 Years Return to Base
- ☐ Upgrade Return to Base to On-Site

**COMPUCON 15.1" LCD Flat Screen Monitor**
(A8436)
GST Inc
**$1,640**



MAR 10

HARRIS TECHNOLOGY™

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Finance methods are subject to approval.

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# COMPUCON

Check for latest prices & products!

Web Direct www.ht.com.au/cat/compucon

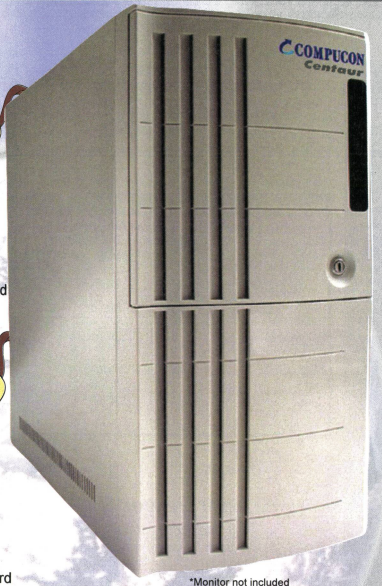
## Compucon Centaur — Pentium 4 Power

**GST Inc**
**$5,199**
**(B2473*)**
Rent for $47.39 per week over 3 years

- Compucon 1.4GHz
- Intel Pentium 4 CPU
- 128Mb RAM
- 30Gb Hard Drive
- 16xDVD
- 32Mb SDRAM Graphics Card
- Windows ME

**GST Inc**
**$6,436**
**(B2584*)**
Rent for $58.66 per week over 3 years

- Compucon 1.5GHz
- Intel Pentium 4 CPU
- 128Mb RAM
- 45Gb Hard Drive
- 16xDVD
- 32Mb SGRAM Graphics Card
- Windows ME




*Monitor not included

RENTSMART

$200 TOUCH'N Rain Rainbird

SEE PAGE 64 FOR DETAILS

The figures quoted are based on a per week basis over 3 years. To approved persons, Terms and Conditions apply.

Web Direct

See Web Direct Link (at top of page) for more products and latest info!

intel inside pentium 4

### Pentium 4 Centaur (B2473) COMPUCON

- Intel Penium 4 - 1.4Ghz CPU
- Intel D850GB Motherboard, i850 chipset
- 128MB RDRAM (Rambus)
- 30GB Hard Drive, 7200RPM
- Compucon Centaur Tower Case
- 1.44 MB Floppy Drive
- Compucon Internet Keyboard
- Compucon Scroll Mouse
- SoundBlaster 128 Sound Card
- Intel 10/100 Network Card
- Windows ME on CD, Microsoft Encarta
- Microsoft Games Pack

MAR 11

**Sales:** 1300 13 9999
**Fax:** 1300 13 6666
**Website:** www.ht.com.au
**E-mail:** sales@ht.com.au
**Delivery** Australia-Wide

Acer

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# Desktops and Notebooks

notebooks

RENTSMART

VOUCHER $200 Rental Reimbursement

SEE PAGE 64 FOR DETAILS

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## Acer Travelmate

The **TravelMate 350** offers unique integrated Smart Card technology to enable users to conduct secure online transactions, including online banking and shopping. The Smart Card also enables users to lock their systems against unauthorised access and supports encryption and decryption of files stored in the system.

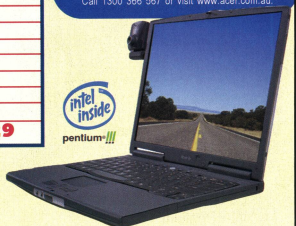
| MODEL | 350TE | 521iT |
|---|---|---|
| SCREEN | 13.3" TFT | 12.1" TFT |
| CPU | PIII 650 SpeedStep | Celeron 600 |
| RAM | 64 MB | 64 MB |
| HDD | 10 GB | 5 GB |
| GRAPHICS | 8 MB | 8 MB |
| CD ROM | 24 X CD | 24 X CD |
| DVD | NO | NO |
| FAX/MODEM | 56Kbps | 56Kbps |
| OTHER | 10/100 LAN | 10/100 LAN |
| OP. SYSTEM | Windows ME | Windows 98 |
| Part # | (B3080) | (B1708) |
| Rental | $48.30 | $30.68 |
| GST Inc | $5,299 | $3,129 |

## Our 2-hour warranty service is our commitment to you.

2 HOUR Acer

Everyone at Acer is committed to being there for you like no one else will. That's why six out of ten of Australia's biggest IT users, use Acer PCs. And why Acer was rated No.1 in customer service and support by the Australian Personal Computer magazine survey. Our quality TravelMate notebooks carry our guarantee of a 2-hour warranty service in Sydney, Melbourne, Brisbane, Canberra, Perth and Adelaide*. This means we'll fix your TravelMate notebook within two hours of you dropping it off at one of our service centres. Acer is the only computer company that can make that assurance to all its customers.

Call 1300 366 567 or visit www.acer.com.au.




desktop

Ask about...

EXTENDED HARRIS WARRANTY

- ☐ Extend to a total of 3 Years Return to Base
- ☐ Extend to a total of 5 Years Return to Base
- ☐ Upgrade Return to Base to On-Site

## Acer Power Sx

*At the heart of the AcerPower Sx series is the SiS630 chipset, which provides a platform for the full range of* Intel® Celeron and Pentium III processors. To further enhance multimedia-computing environments and add rich sound to your multimedia projects, the AcerPower Sx features true 16-bit audio on a PCI interface. Finally, the microtower housing design provides total structural integrity, durability and operational peace of mind integrated within an attractive and highly useable housing. AcerPower Sx has the winning combination for small businesses.



| MODEL | ACERPOWER SX | ACERPOWER SX |
|---|---|---|
| CPU | C633 | PIII866 |
| RAM | 64MB | 64MB |
| HDD | 10GB | 10GB |
| CD / LAN | 50X / 10/100 | 50X / 10/100 |
| VIDEO | Integrated UMA 8MB | Integrated UMA 8MB |
| OP. SYSTEM | Win98 | Win98 |
| Part # | (B4513) | (B4514) |
| Rental | $20.37 | $22.92 |
| GST Inc | $1,859 | $2,337 |

MAR 12

HARRIS TECHNOLOGY

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SONY

Web Direct www.ht.com.au/cat/sony

# Introducing the *NEW* VAIO!

## Sony VAIO XE17

Intel Pentium III, 800MHz
128MB SDRAM (Max 256MB)
20GB HDD
14.1" colour TFT display
Jog-Dial, USB & i-link™
Docking Station



B2173) GST INC

**$6,199**

## Sony VAIOC1VM

- Crusoe(tm) Processor
- TM 5600 600MHz
- 128MB SDRAM (Max 192MB)
- 12GB HDD
- 8.9" colour TFT display
- USB & i-link™, Memory Stick slot
- Camera 1/6", 350,000 pixel progressive scan CCD.



(B2176) GST INC

**$3,799**




## Sony Memory Stick

Smaller than a stick of chewing gum, Memory Stick is the next generation of digital storage media. Imagine carrying around an entire encyclopedia, your complete medical records, a whole library of electronic books and generations of family albums in your pocket. Now imagine Memory Stick - a miniature recording media that fits every digital product you own, including your mobile phone, car, PC, Laptop, camera, Handycam, personal audio player, hi-fi, TV, photo frame and robot. And this is only a taste of what's to come. Memory stick allows information, images, sound and other digital data to move from one digital device to another. Sony has released the 8MB, 16MB, 32MB & 64MB with 128MB & 1GB in development. Transferring Memory Stick data is easy through Sony's easy-to-use Memory Stick Floppy Disk Adaptor, PC-Card Adaptor or a fast USB Memory Stick Mouse.
Sony's vision of a Memory Stick universe is already a reality.

## Sony VAIO Z505

Intel Pentium III, 750 MHz
128 Mb RAM
20 Gb HDD
12.1" TFT display
Jog-Dial, USB & i-link™



B2175) GST INC

**$4,899**

## Sony VAIO F770

- Intel Pentium III, 650 MHz
- 64 Mb RAM
- 20 Gb HDD
- 14.1 TFT display



(B6805) GST INC

**$Call**

VAIO

RENTSMART

TOUCHED BY 200 SATISFIED CUSTOMERS

SEE PAGE 64 FOR DETAILS

The figures quoted are based on a per week basis over 3 years. To approved persons, Terms and Conditions apply.

Ask about... EXTENDED HARRIS WARRANTY

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MAR 13

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SONY

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Web Direct www.ht.com.au/cat/sony

# FD Trinitron- Still the Best Quality

## CPDE220 (17")

NEW!

16" viewable image, 1280 x 1024 @ 75 Hz, Max Refresh Rate: 85Hz @ 1024 x 768 8, Complete On-screen Menus, Anti Reflective Screen Coating, Windows® 95/98, Windows® NT.



(B1831) GST INC **$794**

## CPDG400 (19")

18" viewable image, 1880 x 1440 @ 70 Hz Max Refresh Rate: 85Hz @ 1600 x 1200, Complete On-screen Menus, Anti Reflective Screen Coating, Windows® 95/98, Windows® NT.



(84023) GST INC **$1,269**

## CPDG500 (21")

19.8" viewable image, 2048 x 1536 @ 75 Hz Max Refresh Rate: 85Hz @ 1800 x 1350, Complete On-screen Menus, Anti Reflective Screen Coating, Windows® 95/98 and Windows® NT.



(84024) GST INC **$2,260**

MONITORS

HARRIS TECHNOLOGY

Target.

Ballarat (VIC), Camberwell (VIC) & Epping (VIC)

**Target Shoppers!**

Not all products are in-store, but consulting & advice available on all items

# Flat Display LCD

## SDMN50 (15")

15" XGA TFT Active Matrix LCD Panel, Black Matte Finish, Bright Picture, Sharp Images - 300:1 Contrast Ratio 200 cd/m2 Luminance / 0.297mm Dot Pitch, 1024 x 768 @ 75Hz, Wide Viewing Angle 140°, Stereo Speakers in Base, On-screen Digital Controls, Windows® 95/98 and Windows® NT.



(97422) GST INC **$2,699**

## SDMM51 (15.1")

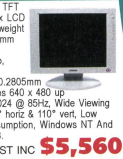
15.1" XGA TFT Active Matrix LCD Panel • Digital Multiscan® supports up to 1024 x 768 @ 75 Hz, Max resolution 1024 x 768 @ 75Hz, Wide viewing angle - 140°, Built-in Stereo Speakers and Headphone Jack, Windows® 95/98 and Windows® NT.



(B0916) GST INC **$2,129**

## CPDL181 (18.1")

18.1" SXGA TFT Active Matrix LCD Panel, Lightweight at 9 kg, 206mm deep, 300:1 contrast ratio, 200cd/m2 luminance, 0.2805mm dot pitch, Res 640 x 480 up to 1280 x 1024 @ 85Hz, Wide Viewing Angle - 140° horiz & 110° vert, Low Power Consumption, Windows NT And Windows 98.



(84011) GST INC **$5,560**

**Assorted Memory Sticks**

**8MB Memory Stick** (88647) GST INC **$79**

**16MB Memory Stick** (86779) GST INC **$112**

**32MB Memory Stick** (88654) GST INC **$185**

**64MB Memory Stick** (88648) GST INC **$299**

## Cyber-shot DSC-S30

**Memory Stick Digital Camera 1.3 Megapixel**

InfoLithium M (NPFM50), 3x Zoom (6x Precision Digital), 2.5" Free-Angle LCD, Email, Video out, USB, External flash socket, 1280x960 (1.3 Megapixel) Resolution, MGI PhotoSuite (Windows/Mac), MGI VideoWave (Windows), 1yr warranty



(99849) GST INC **$1,130**

## Cyber-shot DSC-F505V

**Memory Stick Digital Camera 3.3 Megapixel**

InfoLithium S (NPFS11), 5x Zoom (10x Precision Digital), 2" LCD, MPEG Movie HQ, Voice Memo, Email, Audio/Video out, USB, External flash socket,



2240x1680 (3.3 Megapixel) Resolution, MGI PhotoSuite (Windows/Mac), MGI VideoWave (Windows), 1yr warranty

(A7100) GST INC **$1,850**

## Cyber-shot DCSP1

**NEW Memory Stick Digital Camera 3.3 Megapixel**

3.3 Megapixel resolution
3x Optical zoom (6x Precision Digital zoom)
Memory Stick Digital Still Camera
MPEG Movie function



(B1237) GST INC **$1,999**

## Mavica FD85

**Floppy Disk Digital Still Camera 1.3 Megapixel**

3.5" 2HD Floppy, InfoLithium L (NPF330/NPF550), 3xZoom (6x digital), 2.5" LCD, MPEG Movie, Voice Memo, Email, Audio/Video Out, External Flash Socket, 1280x960 (1.3 Megapixel) Resolution, Memory Stick/Floppy Disk Adaptor Compatible, MGI PhotoSuite, MGI Video Wave (Windows).



(A0814) GST INC **$1,455**

## Mavica CD1000

**Mini CD-R Digital Still Camera 2.1 Megapixel**

8cm 156MB CD-R, InfoLithium L (NPF330/NPF550), 10x zoom (20x Precision Digital), Electronic Viewfinder, 2.5" LCD, MPEG Movie HP, Voice Memo, Email, Audio/Video Out, USB, External Flash Socket, 1600x1200 (2.1 Megapixel) Resolution, Picture Gear 4.1 Lite, MGI PhotoSuite, MGI VideoWave, Adaptec DirectCD.



(A7097) GST INC **$2,645**

CAMERAS

MAR 14

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**Sony CRX160SBK**

2x Records & 8x Rewrites, High speed 32x playback. Support ormats: CD-ROM, CD-Audio & Video CD, SCSI-II nterface. Buffer memory 4Mb. upports CD writing and ReWriting n both 74min/650MB disks and ew 80min/700MB disks. Writing ethod: Disc, Session, Track, ariable or Fixed Packet, Multi ession, Track Reservation. oftware bundled: Adaptec's Easy-D Creator version 4.02 and irect-CD. Bundled 1 blank CD-RW nd 1 CD-R.




A7056) GST INC **$615**

**Sony CRX140EBK**

IDE: 8x write, 4x rewrite & 32x read; Suites 5.25" 1/2 Height slot. Supplied with additional interface cable, audio cable, software (Adaptec Easy CD Creator & Direct CD for Win 95, 98, NT & 2000 Pro), media (one CD-R & one CD-RW disk), mounting screws & easy-to-follow installation manual.




IDE: (88568) GST INC **$340**

*ALL SONY DDS AND AIT TAPE DRIVE KITS INCLUDE BONUS INNOCULAN ANTI-VIRUS SOFTWARE*

## DSS STORAGE & MEDIA PRODUCTS



**Sony Floppy Discs**
Pack 3 3.5" 1.44Mb
(A5699) GST INC
**$5**

**Memory Stick Mouse**
- USB mouse with built-in memory stick reader/ writer
- Optical sensor
- Left/ Right" and scroll button

(B1238) GST INC **$215**



DDS2 Digital Data Storage

**Sony DDS Work-station Backup Kit**
(84341) GST INC
**$1,075**

DDS3 Digital Data Storage

**Sony DDS Work-station Backup Kit**
(88573) GST INC
**$1,839**

DDS Digital Data Storage ||||

**Sony DDS Server Backup Kit**
(B6844) GST INC
**$2,675**

## AIT STORAGE

AIT tape drive uses the worlds most Advanced & reliable media. Stores 35-105GB per tape at up to 9MB/s. Supplied as a kit with cables, media and backup software it is designed for use on a Win NT Workstation, Win NT Server or Netware Server.

Internal 3.5": (45747) GST INC **$2,490**

Internal 5.25": (88582) GST INC **$2,490**

External: (45749) GST INC **$2,905**




For the ultimate in Capacity, Performance and Reliablity you can't go past AIT-2. This kit stores 50-150GB per tape at up to 18MB/s and is supplied with cables, media and backup software (Win NT Workstation/ Server & Netware).

Internal 3.5": (88585) GST INC **$5,725**

Internal 5.25": (88586) GST INC **$5,725**

External:(80636)GST INC **$6,299**

## MEDIA




**Sony 2HD Pack 10**
(A0151)
GST INC
**$10**




**SDX1-35C**
(B2626)
GST INC
**$215**




**SDX2-50C**
(80637)
GST INC
**$240**




**SDX1-25**
(64336)
GST INC
**$155**




**SDXT-CL**
(45755)
GST INC
**$85**

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# HP Networks & Servers

***NEXT BUSINESS DAY ADVANCE REPLACEMENT - LIFETIME WARRANTY***

*****PLEASE NOTE THAT PRICES ARE SUBJECT TO CHANGE ON ALL PRODUCTS*****

## HP ProCurve Switch 408



Unmanaged 8 port 10/100 switch in a compact sized package. This switch offers half/full duplex, 10/100 autosensing on every port. Warranty: Lifetime, Exchange Next Day (79125) GST INC: **$347**

## HP ProCurve Switch 2512 & 2524



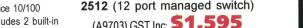
9.6GBPS BACKPLANE & AUTO-MDI/-XI • Lowest Price 10/100 Managed Switch • Provides a rich, layer 2 feature set • Includes 2 built-in gigabit transceiver slots • Auto MDI/-X on all 10/100 and 100/1000 ports • Lifetime warranty for as long as you own the product • Wire-speed performance on all ports • FREE HP TopTools Management Software included

**2512** (12 port managed switch) (A9703) GST Inc: **$1,595**

**2524** (24 port managed switch) (B0062) GST Inc: **$2,045**

## HP ProCurve Switch 2312 & 2324

NEW PRODUCT



Ideal for low-cost, unmanaged 10/100 connectivity • Lowest Price 10/100 Switch • Includes 2 Built-in Gigabit transceiver slots • Brings 10/100/1000 solutions to the market • Media-flexible ports for uplinks and server connections • HP quality, functionality and performance • Plug and play solution

**2312** (12 port unmanaged switch) (B0063) GST Inc: **$965**

**2324** (24 port unmanaged switch) (B0064) GST Inc: **$1,100**

## HP ProCurve Switch Modules

NEW PRODUCT

HP ProCurve Switch Gigabit Stacking Kit (78306) GST INC: **$375**

HP ProCurve Gigabit-SX Transceiver (82140) GST INC: **$1,098**

HP ProCurve Gigabit-LX Transceiver (82141) GST INC: **$1,770**

HP ProCurve100/1000-T Transceiver (A9127) GST INC: **$763**

HP ProCurve 100-FX SC Transceiver (A9128) GST INC: **$520**



HARRIS TECHNOLOGY. for all your computer needs!

## HP ProCurve Switch 4000m



HP's 40 port managed 10/100/Gigabit switch provides a scalable low cost switching solution for organisations looking for scalable, expandable, low-cost migration to 10/100/Gigabit. • High speed/media-flexible uplinks including 10/100Base-T,Gigabit-SX, LX, and 1000Base-T. • Switch meshing = high availability with high performance • Stacking capability with single IP address management.

(66063) GST INC: **$4,900**

## HP NETSERVER E-200



The Server with the best price/performance value for small businesses.

Starts your small business off on the right Track. The HP NetServer E200 offers the best value-to-performance ratio of any major server supplier.

A desktop PC may do the job when you are starting out, but as your small business expands, it quickly out grows the ability to cut corners on something as fundamental as a server. And with the HP NetServer E200 HP leads the top tier server suppliers offering full server grade technology, functionality and performance for the price of a PC.

- Intel PIII800 MHz processor with 133MHz front size bus
- 64MB registered ECC RAM standard (expandable to 768)
- 9.1GB, 7200rpm, 68-pin Ultra Wide SCSI HDD
- Four PCI, one ISA
- Integrated HP NetServer 10/100TX LAN adapter

All systems include: 7 mass storage shelves (4 available after floppy, CD-ROM & 9GB disc), 5 expansion slots (4 PCI, 1 ISA combination), integrated 10/100 network interface, and easy set up CD.

(B1564) GST INC: **$3,129**

**Rent 3 yrs - $30.68*** Call for long term *rental pricing

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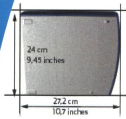
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# HP Desktops

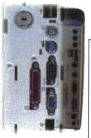
## HP e-pc

HOT NEW PRODUCT



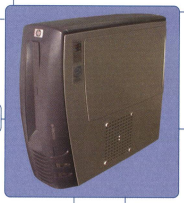



**Storage**
Removable, generously proportioned hard disk drive for all user needs.



**Connectivity**
Lockable USB, serial, parallel, PS/2 and LAN ports to fit your computing environment.

**Ultra-small, ultra-smart**
The revolutionary e-Vectra measures only 9.5 inches (24 cm) high.







**Media Choice**
Fast, slim CD and media-free models.

**Power**
Powerful Intel Pentium III and Celeron processor configurations and generous RAM to suit any business application.



**Operating Systems**
Choose from a range of Microsoft operating systems including Windows 2000 to match your corporate standard.




**e-Diagnostics**
The intelligent eDiagTools technology allows instant problem identification and web-enabled notification to HP or your support staff.

| Processor: | hp e-pc C633 | hp e-pc C700 | hp e-pc P800 | hp e-pc P866 |
|---|---|---|---|---|
| SDRAM | 64MB | 64MB | 128MB | 128MB |
| Hard Disk | 10G | 10G | 20G | 20G |
| FDD | optional | optional | optional | optional |
| Monitor | no | no | no | no |
| CD - ROM | 24x | 24x | 24x | 24x |
| OS | Windows '98 | Windows '98 | Windows '98 | Windows '98 |
| Modem | Yes | Yes | Yes | Yes |
| Software | Word 2000 | Word 2000 | Word 2000 | Word 2000 |
| Part No.: | (B1743) | (B1744) | (B1745) | (B1746) |
| GST INC: | **$1,958** | **$1,998** | **$2,459** | **$2,697** |
| **Rental:** | **$21.46** | **$21.90** | **$24.11** | **$26.45** |

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HP COMMERCIAL WORKGROUP RESELLER
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RENTSMART

SEE PAGE 64 FOR MORE DETAILS

The figures quoted are based on a per week basis over 3 years. To approved persons, Terms and Conditions apply.

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OPTISTOR®

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# Printer, Camera's & CD-R/W

## Desktop CD Duplicator
## DESKTOP DTP

*Meet your New Office Partner*



The Desktop Publishers integrate software, production robotics and ink jet printing for quick, easy production of one-of-a-kind CDs or duplicate CDs
***Connects to your computer. Ready to go. Easy to do!***
For the ultimate in compact design, offers convenience and professional CD-R quality, choose the Desktop from Rimage.



**Desktop DTP 800- 1 drive**
(B4413) GST INC **$8,950**

**Desktop DTP1000- 1 drive**
(B2968) GST INC **$13,730**
* Illustration shows 2 drives

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## Network Cameras AXIS 2120

AXIS COMMUNICATIONS

***If a picture says a thousand words then an Axis network camera can speak volumes.***



Catch it, Web it, Watch it... Built-in Web server and motion detection. The perfect tool for any web attraction application! No PC required for transmitting your images over the WAN/LAN or the Internet - you're just a network plug away from live remote monitoring from any convenient desktop.

- Plug-and-Watch – over any TCP/IP network
- Built in Web Server
- Built in motion detection
- Plugs into hub or modem
- Video stream – 25/30 images/second
- DC iris support– for outdoor light conditions



(A3916) GST INC **$2,750**

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See Web Direct Link (at top of page) for more products and latest info!

## OPTISTOR® CD/DVD Server
## CACHING TOWER



The new Optistor CD/DVD Caching tower is yet another addition to the Optistor NAS (Network Attached Solutions) range. Featuring:

- The Axis CDE100 CD-ROM Server,
- Hard disk caching support for up to 255 CD's or 95 DVDs.
- Great news for organisations that require fast access to information stored on CDs and DVDs!
- Includes DVD Rom drive to load CD and DVD data

Towers start from 25 CD or 4 DVD Capacity through to 255 CD's or 95 DVD's.

**FROM $3,675**

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Maxtor

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# The Easy way to add Storage

Maxtor 1394 External Storage™ is the fast, easy way to add storege to your PC. With data transfer rates up to 30 times faster than USB and the highest capacity available, the 1394 External Storage solution is perfect for today's storage-hungry digital entertainment equipment. Just plug it in and go - its ready to use right out of the box for PC users. compatible with 1394 , i.LINK and FireWire and powered by Maxtor's award-winning hard drive, it offers dependable storage/back-up for all your imiportant documents and precious memories. Regardless of which capacity you select, every Maxtor External Storage device is backed by uparalleled support, including Maxtor's renowned No Quibble Service.




**40GB Maxtor 1394 External Storage Unit**

(B6511) GST INC **$689**

**80GB Maxtor 1394 External Storage Unit**

(B6512) GST INC **$995**

**80 GB**
**40 GB**

Easy Installation

13694, iLINK and FireWire Compatable

Stackable ultra-sleek design

400 Mb/sec data transfer rate

Powered by Maxtors award-winning hard drive



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imaginative solutions.

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# Burn your own CDs & more!

**Imation's new CD Burn-R lets you create custom CDs from your music and photo collections. Use your new Burn-R to share your creations with friends or to easily back up your files. Comes complete with the internal drive, software and even Imation CD-R and CD-RW discs to get you started.**

**MP3.COM - FREE Multimedia CD from MP3.COM inside, Includes 100 incredible songs. Great music, great offers and a whole lot more**

- Burn your own custom audio, music, or multimedia CDs.
- Record, change your mind, and re-record up to 1,000 times on just one Imation CD-RW disc.
- Easily, safely and quickly back up files with 8x recording speed.
- Retrieve files with lightning fast 32x read speed—Fast enough to be your primary CD-ROM drive too.
- Ready to use—includes software, 1 Imation CD-R disc and 1 Imation CD-RW disc.
- Reliable—From Imation, a leading supplier of branded removable data storage media.
- Windows 95/98/NT/2000 compatible.




**Imation CD Burn-R Internal 8x4x32 CD-RW Drive**

(B6520) GST INC **$385**

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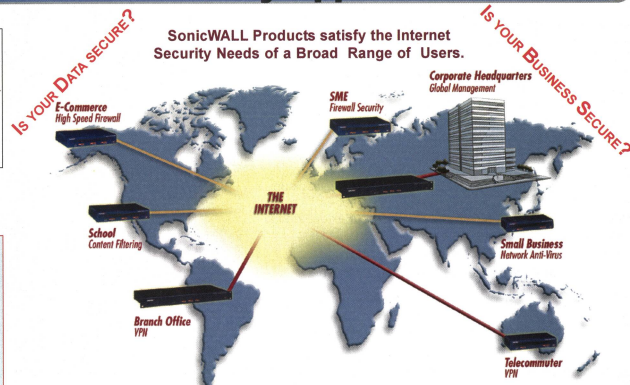
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# Internet Security Appliances

Fast Delivery Australia Wide




## Complete Internet Security

**Firewall Security.** SonicWall Internet security appliances use stateful packet inspection to protect the private LAN from hackers & vandals on the Internet

**IPSec VPN.** SonicWall VPN provides an easy, affordable & safe way to connect offices & partners together over the Internet. Encryption methods include 168 bit Data Encryption Standard, (Triple-DES), 56 bit Data Encryption

**Standard (DES) & 56 bit ARCFour.** SonicWall VPN can be used with IPSec VPN products such as Checkpoint Firewall-1, Cisco PIX, Nortel Contivity & Axent Raptor. With the SonicWALL Authentication Service, you can add strong Authentication via public key infrastructure, (PKI) and digital certificates.

**ISCA certified.** SonicWall has been awarded the internationally accepted ISCA certification. Network Anti-Virus. Based on Network Associates' product, the SonicWall Anti-Virus ensures corporations are protected against the latest virus outbreaks by automatically updating the clients as soon as new cures are available.

**Internet Content Filtering.** Businesses can create & enforce Internet access polices tailored to their needs.

**AutoUpdate.** All firmware updates are free for the life of the product. The firewall automatically checks for new firmware updates with protection against newly discovered hacker attacks.

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| Model | Details | Part No | INC GST |
|---|---|---|---|
| TELE2 | Max 5 users, Inc. Branch VPN Upgrade<br>* For securing telecommuters, Cable/xDSL users, small offices. | (B3030) | $1,499 |
| SOHO2 | 10 users, 1 X WAN Interface, 10/100 Base-T auto-sensing, 1 X LAN Interface 10/100 Base-T auto-sensing. 10 x VPN tunnels, 3/DES | (B3031) | $1,250 |
| SOHO2 | 50 users, 1 X WAN Interface, 10/100 Base-T auto-sensing, 1 X LAN Interface 10/100 Base-T auto-sensing. 10 x VPN tunnels, 3/DES * Upgrade to support 50 or unlimited users (nodes).<br>* For securing SOHO sites or for linking up to 10 sites via VPN. | (B3034) | $2,498 |
| XPRS2 | Unlimited users, 1 X WAN, 1 X LAN, 1 X DMZ Base-T, auto-sensing. Toshiba TX3927 CPU, 3/DES, optional Branch VPN upgrade. Supports multiple Remote User VPN tunnels. 20 x VPN tunnels<br>* For hosting more active or multiple public servers & RU-VPN | (B3038) | $5,545 |
| PRO | Unlimited users, 1 X WAN, 1 X LAN, 1 X DMZ Base-T, auto-sensing. Rack mountable. 233 HMz StrongARM RISC CPU. Upgradeable memory. Inc Branch VPN Upgrade Supports multiple Remote User VPN tunnels.<br>* For securing large sites, hosting public servers, & RU-VPN | (B3039) | $7,389 |
| PRO-VX | Same features as the PRO plus more..... Adds VPN Acceleration card, RAM/Flash - 16MB/4MB RAM & inc. 50 x VPN clients.<br>*For supporting up to 1,000 Branch & Remote VPN tunnels. | (B3040) | $11,998 |

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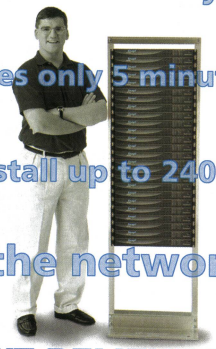
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# Quantum

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## If it's important to you, save it with us

"If someone tells you it takes only 5 minutes to install up to 240GB on the network, DON'T BELIEVE IT."



### Ease of Use
- Auto-sensing 10Base-T/100Base-TX
- Automatic recognition of network types/clients
- Supports DHCP, BOOTP and RARP
- Configuration via Web browser

### Features
- Embedded OS (unlimited user license)
- Pentium-class processor
- Ultra ATA hard drives
- RAID 5, 1 or 0
- Easily supports 100 or more clients

### Compatibility
- Simulaneous support for Windows 2000, NT, NetWare, UNIX, Linux and Macintosh networks and clients across TCP/IP, IPX, NetBEUI and AppleTalk networks

### Network Backup
- Compatible with Windows and Netware backup software, including Veritas Backup Exec, Computer Associates ARCserveIT and Microsoft backup software for Windows 95/98/NT/2000

### Network Security
- Integrates with Microsoft Domain Controllers or local user list

### Guarantee
- 3-year parts and labour

### Price

| | | | |
|---|---|---|---|
| 15GB | - (A3489) | GST Inc. | **$1,259** |
| 30GB | - (A3528) | GST Inc. | **$1,910** |
| 60GB | - (A8926) | GST Inc. | **$3,695** |
| 120GB | - (A8118) | GST Inc. | **$6,335** |
| 240GB | - (A8119) | GST Inc. | **$9,995** |

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### "I did it in 43.55 seconds."
**Don Knisley, Network Engineer, US Air Force**



Snap Servers are engineered for one purpose: file sharing. That's why Don could have a Snap Server 2000 up and running on a LAN in 43 seconds! "If I had the choice of installing an NT server for network storage or a Snap Server, I'd pick the Snap Server" says Don. "It's fast, easy and the browser configuration tool is very intuitive." According to a recent PC data report, 4 out of 5 workgroup network attached storage (NAS) servers sold are Snap Servers. That's why Snap Server is the world wide leader and most awarded NAS product on the market today.


1. Plug into AC power


2. Connect to Ethernet hub


3. Turn Snap Server on

# Quantum

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www.ht.com.au/quantum

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**Fax:** 1300 13 6666
**Website:** www.ht.com.au
**E-mail:** sales@ht.com.au
**Delivery** Australia-Wide

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# Accessories

## Palm™ *Slim Leather Case*

(63801) GST INC

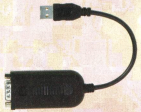
**$50**



## PalmConnect™ *USB Kit*

(89613) GST INC

**$109**



## Palm M100™ *Cradle*

(A7219) GST INC

**$69**



## Palm V™ *Cradle*

(74669) GST INC

**$115**



## Palm V™ *Leather Belt Clip Case*

(74673) GST INC

**$50**



## Palm V™ *Modem*

(74668) GST INC

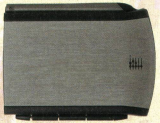
**$340**



## Palm V™ *Hard Case*

(74676) GST INC

**$80**



## Palm V™ *Travel Kit*

HotSync cradle, plug adapters and AC charger.

(74677) GST INC

**$110**



## Palm III™ series *PalmGlove*

Black (82231) GST INC

**$50**

Also available: Purple, olive,royal blue, teal & yellow.



## Palm™ *Mobile Internet Kit**

(B3065) GST INC

**$50**

* For Palm M100, III, IIIx, IIIxe, IIIc or V series.




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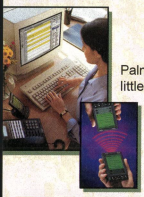
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# Handheld Computers



## Palm™ Handheld Computers from Harris Technology

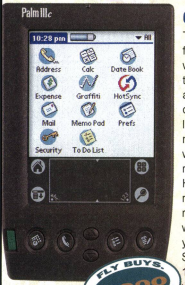
Palm™ handheld computers manage life's little details. It will help you stay on top of things everywhere you go. You can store thousands - literally thousands - of names, addresses, phone numbers, to-do's, and expenses, plus hundreds of e-mail messages. You can synchronise all your information with your desktop computer at the touch of a button. More features: Infrared communication. Access your e-mail* with the Palm Modem® accessory. Applications: Date Book, Address Book, Mail, To-do List, Memo Pad, Expense, Calculator, Security, Games, HotSync®.

*Additional software required.

FLY BUYS 1,000 BONUS POINTS

Collect 1,000 Bonus Fly Buys points when you purchase 95059 or B2406 between 20/02/01-31/03/01

## Palm IIIc™ Handheld Computer




FLY BUYS 1,000 BONUS POINTS

**Colorful**

The Palm IIIc™ combines functionality and speed with advanced screen technology that renders a vivid, clear colour display. A rechargeable lithium ion battery lasts more than two weeks with normal use, and recharges in your HotSync® cradle in just minutes a day. An optional recharger kit is great when you're away from your PC.

Stores approximately: 10,000 addresses, 5 years of appointments, 3,000 to-do items, 3,000 memos, 400 e-mail messages and lots of third-party applications.

95059) GST INC

**$649**

## Palm IIIxe™ Handheld Computer



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It's the perfect combination of flexibility and power. With 8MB of storage capacity, the Palm™ IIIxe handheld keeps track of thousands of names, addresses, appointments, to-do's and memos with plenty of room to spare for add-on applications. Flash ROM means future upgrades will be a snap. Classic Functions: Date Book, Address Book, To Do List, Memo Pad, Infrared (for beaming). Extras: Mobile Internet and e-Mail Access, AvantGo's Web Channel Manager, Link to Microsoft Outlook included, Storage Capacity 8 MB of Memory.

(B2406) GST INC

**$449**

Bonus case and CD when you buy a Palm IIIxe handheld computer. Limited offer. While stocks last. See box sticker instore or visit www.palm.com.au for details.

## Palm™ Portable Keyboard

Leave your laptop in the office. Carry this pocket-sized keyboard to take notes at your next meeting or write reports on an airplane. Folds down small. Weighing in at less than 250 grams, this full-size keyboard tri-folds into a size just slightly bigger than a Palm™ handheld itself. Unfolded, it's the same size as your desktop keyboard.No batteries required.

(87210) GST INC suits V Series **$196**



Tri-fold Keyboard Goes Anywhere!

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# Power Back Up = Power Protection



**Back-Ups for PC's!**

**300va**
(56229)
GST INC
**$150**

**500va**
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GST INC
**$205**

**650va**
(56231)
GST INC
**$269**



**APC Symmetra**
Power Array
8kVA, exp. to 16kVA
(71087)
GST INC
**$13,050**

**So good we use it ourselves!**

## APC Smart-UPS 2U Rack Mounts®

### Smart-UPS 700, 1000, and 1400 2U Rack Mounts

Network power protection to increase availability of your system. APC Smart-UPS 2U Rackmount features include longer runtime to keep your system safe and a 2U design to save your valuable rack space by 30%. Hot swapping batteries is also now faster and easier with the replacement battery chassis tray.



APC Smart-UPS **2u700** (99595) GST INC **$689**

APC Smart-UPS **2u1000** (99596) GST INC **$990**

APC Smart-UPS **2u1400** (99597) GST INC **$1,409**

## APC Back Ups Pro® for workstations

### Smart battery backup & high performance surge suppression for Windows 95 & NT PCs

• PowerChute® Plus software lets your UPS shut down your applications gracefully in the event of an extended power failure • Additional outlet for protection of printers • Audible alarms • Phone/ modem protection • User replaceable, hot swappable batteries



APC Back-UPS Pro **280si** (76636) GST INC **$250**

APC Back-UPS Pro **420si** (76637) GST INC **$350**

APC Back-UPS Pro **650si** (76638) GST INC **$470**

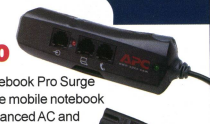
## APC Surge Arrest- PNote Pro®



**Surge Arrest 5 Strip**
(A0098) GST INC
**$69**

An APC SurgeArrest is your guarantee that your hardware and valuable electronics are protected regardless of lightning strikes and everyday unexpected power surges. SurgeArrest also offers the best protection from line noise which can cause glitches and errors in electronic operations and computer data.

**PNote Pro**
(99592) GST INC **$50**



The SurgeArrest Notebook Pro Surge Protector provides the mobile notebook professional with advanced AC and telephone line protection. The unique, in-line design creates a compact, lightweight surge protector that is truly portable and appropriate for use in any country throughout the world. With built-in Excess Current Detection, the Notebook Pro warns you against potential modem damage. A Velcro mounting strap and 6 ft. telephone cord eliminate the need to carry any additional accessories.

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24

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TARGUS
A TRADITION OF EXCELLENCE

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# accessories for today's portable technology

## Carry It

### Targus EasyRoller Carry Case

The new Targus EasyRoller, combining design and function for the frequent flyer. A cleverly designed multi-function rolling case for your notebook computer.

(B1659) GST INC
**$190**



## Power It

### Universal Auto/ Air Power Adaptor

Powers your notebook via car cigarette lighters and airline seats with Empower capability. Please call to see which part number matches your notebook.



PA350U (79972) GST INC
**$180**

PA375U (B1660) GST INC
**$185**

### Universal AC Adaptor

Light and compact, one AC adaptor for your notebook, mobile phone and portable printer - just by changing the PowerTip!

AC ADAPTOR

(76296) GST INC **$180**



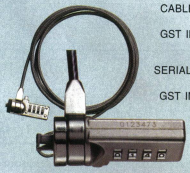
**Fly Buys.**

Collect **Fly Buys** points on all your computer accessories when you purchase from HARRIS TECHNOLOGY.

## Secure It

### Defcon Cable Locks

Security begins with the keyless Defcon Cable Locks, both user-settable and corporate serialised versions. Attach to the computer lock slot.



CABLE LOCK (81511)
GST INC **$54**

SERIAL LOCK (A6306)
GST INC **$54**

## Use It

### Retractable ISDN RJ-45 Network Cord and Retractable Telephone Cord

Now you can eliminate loose telephone cables for connecting to telephone jacks while on the road. Fits right in your pocket! Both have 2.4m of retractable cord.



TELEPHONE CORD
(72101) GST INC
**$25**

ISDN RJ-45 CORD
(B1670) GST INC
**$42**

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# NETGEAR™

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## take the work out of networking - plug int


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vintagecellars.com.au


### network starter kits

**SB 105** 5 Port 10Mbps hub, 2x10/100PCIcards, cables, modem sharing software and guide

(A3293) GST INC **$130**

**FB 105** 5 Port 10/100 switch, 2x10/100 PCI Cards, cables, modem sharing software and guide

(A3935) GST INC **$249**



## shared internet access

The NETGEAR routers offer the ability to connect to the internet easily using ISDN, analogue or Cable/DSL. All products support IP routing and offer NAT and DHCP for security and ease of set-up.

**FR314** 4 Port 10/100 mbps cable/dsl firewall router NEW
(B6554) GST INC **$820**

**RT 338** 1 Port 10/100 mbps ISDN router
(97718) GST INC **$676**

**RT 314** 4 Port 10/100 mbps switch with cable/DSL interface
(A8862) GST INC **$375**

**RT 328** 1 Port 10baseT ISDN router
(68900) GST INC **$659**

**RT 311** 1 Port 10/100 mbps switch with cable/DSL interface
(97719) GST INC **$289**

**RM356** 1 Port 10baseT hub with intergrated 56k modem
(70197) GST INC **$595**

## 10/100 fast ethernet switches



**FS 105** 5 port 10/100 autosensing
(84722) GST INC **$165**

**FS 108** 8 port 10/100 autosensing
(70905) GST INC **$255**

**FS 308** 8 port 10/100 autosensing
(77242) GST INC **$470**

**FS 116** 16 port 10/100 autosensing
(A5347) GST INC **$549**

**FS 516** 16 port 10/100 auto-sensing and internal PSU/Vista
(60522) GST INC **$895**

**FS 524** 24 port 10/100 switch - stackable
(77549) GST INC **$970**

**FS 524S** 24 port 10/100 switch - stackable NEW
(B6540) GST INC **$1,640**

## 10/100 dual speed hubs



**DS 104** 4 port 10/100 Mbps
(70795) GST INC **$145**

**DS106** 6 Port 10/100 Mbps
(84721) GST INC **$175**

**DS108** 8 port 10/100Mbps
(18755) GST INC **$220**

**DS116** 16 Port 10/100 Mbps
(81519) GST INC **$395**

**DS508** 8 Port 10/100 Mbps with internal PSU and vista
(18738) GST INC **$439**

**DS516** 16 Port 10/100 Mbps with internal PSU and vista
(18747) GST INC **$595**

**DS524** 24 Port 10/100 Mbps with internal PSU and vista
(69474) GST INC **$790**

## printer servers

The Netgear print servers enables you to connect your printer to a network for sharing amongst multiple PC's



**PS 105** 10 Mbps Print Server
(67225) GST INC **$255**

**PS 110** 10/100 Mbps Print Server
(67226) GST INC **$255**

**PS 113** 10/100 Mbps Print Server 3 Port
(A3287) GST INC **$380**

MAR 26

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# NETGEAR™

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## the power of networking with NETGEAR

**new** *product*
**FS524s**



(B6540) GST INC
**$1,640**

The **NETGEAR** FS524S Stackable Switch is ideally suited for small offices that want to start with a minimal investment, but realize that their Local Area Network (LAN) will grow. The 2 dedicated stacking ports on the back of each switch allow you full use of the 24 Fast Ethernet ports on the front. You can grow your network up to 96 users with additional switches, using a robust backbone bandwidth of up to 4000 Mbps.
**POWERFUL.** Stacking 4 Gigabit connection gives 24-10/100 ports high-performance data transfer and eliminates bottlenecks between switches
**COST-EFFECTIVE.** Gives you the same throughput you'd get with a more expensive 24+2 copper gigabit switch, but for much less money. With the FS524s, you can expand your network without paying for extras- the stacking port is built-in and the stacking cable is included.
**EXPANDABLE.** Provides connectivity for up to 4 switches, enabling your network to support as many as 96 users and allowing for incremental network growth as your budget allows.
**SELF-HEALING.** If one box in a stack fails, the others continue to communicate.
**HASSLE-FREE.** Everything for stacking is included and installation is easy-it's Plug and Play. Stackable for high-speed expandability FS524s Stacking Fast Ethernet Switch.

**gigabit fibre + copper**




**These high performance Gigabit switches provides either fibre or copper backbone connectivity for power workgroups, data centres and server farms. No additional modules are required - each product ready to install straight from box.**

| | |
|---|---|
| **GA 620T** 32/64 bit PCI gigabit network card<br>(77291) GST INC **$739** | **FS 510T** 2 port 100/1000 with 8 10/100 ports (copper)<br>(A1209) GST INC **$1,795** |
| **GS 504T** 4 port 100/100 (Copper)<br>(A1375) GST INC **$2,990** | **FS 518** 2 port 100/1000 with 16 ports 10/100<br>(A1374) GST INC **$2,565** |

**10 mbps ethernet hubs**




| | |
|---|---|
| **EN 104TP** 4 port hub<br>(53456) GST INC | **$75** |
| **EN 106TP** 6 port hub<br>(57629) GST INC | **$89** |
| **EN 108TP** 8 port hub<br>(53458) GST INC | **$99** |
| **EN 116** 16 port hub<br>(53459) GST INC | **$220** |
| **EN 516** 16 port hub with external power<br>(17425) GST INC | **$259** |
| **EN 524** 24 port hub with external power and Vista ports<br>(17435) GST INC | **$325** |




**network cards**

**FA 311** Ethernet adapter 10/100 PCI
(A1372) GST INC **$49**



**FA 312** LAN card
(A1373) GST INC **$53**

**FA 410** PCMCIA 10/100 Mbps Network Card



(60071) GST INC **$155**

**FA 510** Network Card for Notebook PC
(81319) GST INC **$160**

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MAR 27

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See Page 2 for Location Details

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# Mobile Access Solutions

Lucent Technologies Bell Labs Innovations

Ask about...

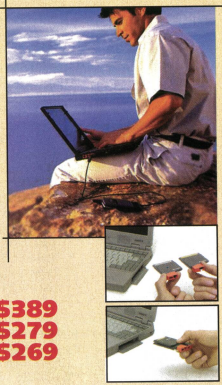
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- ☐ Extend to a total of 3 Years Return to Base
- ☐ Extend to a total of 5 Years Return to Base
- ☐ Upgrade Return to Base to On-Site

## Xircom RealPort II

### The Evolutionary RealPort Integrated PC card With Build-in Connectors and Mix-and-Match Flexibility

Real Port 2 Integrated PC card can be used alone or mixed and matched with other Real Port2 cards to meet individual needs for personalised information access now and in the future. The innovative design enables notebook users to select from a broad range of access technologies including 56Kbps modem, Ethernet, ISDN, GSM, Wireless Ethernet and easily combine the cards together for a customised solution. Eliminate unnecessary cables, purchase only what you need now and add on later. RealPort 2 also enables you the flexibility to adapt to future technologies such as Wireless Ethernet and Bluetooth, whilst saving battery life on your notebook. RELIABLE, EASY and FLEXIBLE.



**RealPort2 Global Access Modem** (92739) GST Inc: **$389**

**RealPort2 10/100 Ethernet Card 16 bit** (92746) GST Inc: **$279**

**RealPort2 CardBus 10/100 Ethernet 32 bit** (92756) GST Inc: **$269**

## Xircom Wireless LAN Card

### The Freedom of True Mobility Without Wires




The Xircom CreditCard Wireless Ethernet Adapter is a Type II PC Card. It is used in Wireless Local Area Networks (WLAN) environment with installed access points.

- Increased Networking Flexibility - WLAN's can be installed where wires can't go
- Conform to IEEE 802.11b standards
- Fast and Simple Network setup - Plug and Play installation of Windows 95, 98, 2000 and NT
- Security: 40-bit and 128-bit WEP encryption options
- Transmission range: WLAN has a range of up to 500 feet (150 meters)
- Increased employee productivity – freedom to roam and stay connected
- Supports wireless peer to peer Network
- Lower cost of ownership – there's no cabling, offers great freedom in older buildings and other unfriendly wiring environments

**CreditCard Wireless Ethernet Adapter, 40-bit standard WEP encryption**
(B4404) GST Inc: **$422**

**CreditCard Wireless Ethernet Adapter, 128-bit strong WEP encryption**
(B4405) GST Inc: **$449**

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# D-Link®

Web Direct www.ht.com.au/cat/dlink

## Small-Medium Business Networks

### DWL-1000AP
**D-Link Air Access Point**

Fast 11 meg Performance. Build The Size of Your Wireless Network, or Extend Your Existing Wired Network.



NEW Wireless TECHNOLOGY

(A9251) GST Inc. **$995**

### DI-701
**Cable ADSL Gateway**

The D-Link DI-701 Residential Gateway protects your computers from hackers or unwanted users. It is the easiest and safest way to share your high-speed Internet connection with a DSL Modem or Cable Modem.



(98249) GST Inc. **$379**

**For all your small to medium business and home network needs please call for more information and pricing. We have an extensive range of fantastic D-Link products on our database.**

### DKVM-8
**8 Port Keyboard, Video and Mouse Switch**

"Easy to use,powerful, and scaleable KVM solution" • Controls 8 different server PC's w/keyboard • Utilizes advanced microprocessor emulation, 2 sets of cables, user friendly interface.



NEW PRODUCT

(B2656) GST Inc. **$859**

### DWL-650
**D-Link Air Wireless PCMCIA Network Card**

11 Megabit Performance. IEEE 802.11b. Make any note book truly portable within your office environment.




NEW Wireless TECHNOLOGY

(A9247) GST Inc. **$345**

### DES-1008D
**8 Port Fast Ethernet Switch**

The D-Link DES-1008D is a powerful desktop Dual Speed 8-port 10/100Mb Ethernet/Fast Ethernet NWay auto negotiating Switch.



(98254) GST Inc. **$289**

### DES-1016R
**16 Port Switch for Workgroups**

Built with advanced functions, these switches are designed for workgroups with advanced requirements. Powerful yet easy to use, they allow users to simply plug any port to either a 10Mbps or 100Mbps node to multiply bandwidth, boost response time and satisfy heavy load demand. Rack mountable.



(98255) GST Inc. **$795**

**Web Direct**

See Web Direct Link (at top of page) for more products and latest info!

| Description | Part # | GST Inc |
|---|---|---|
| D-Link DP-303 10/100 Print Server (3xParallel Port) | (A8876) | $310 |
| D-Link DU-560M External V.90 56K Voice/Fax/Data Modem (USB) | (98306) | $105 |
| D-Link DFM-560I Internal PCI V.90 56K Voice/Fax/Data Modem | (74361) | $65 |
| D-Link DES-3225G 22+2 port 10/100Mbs Mang Switch W/ V-Lan | (90755) | $1,979 |
| D-Link DFE908DX 8 Port 10/100Mbs Dual Speed Hub | (60558) | $270 |
| D-Link DFE-916DX 16 Port 10/100Mbs Dual speed hub | (87207) | $525 |
| D-Link DFE2624x24-port 10/100Mbps Stackable Dual Speed Hub | (98307) | $1,149 |
| D-Link DP-602 2 Port Internet Network Server | (81535) | $379 |
| D-Link DFE-530TX PCI-Bus 10/100Base TX Fast Ethernet Adapter | (62956) | $42 |
| D-Link DWL120 D-Link Air 11Mbs Wireless LAN USB adaptor IEE820.11b | (A8487) | $390 |

MAR 29

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# PC Cameras

HARRIS TECHNOLOGY™ for all your computer needs!



## Intel® Pocket PC Camera

Get a great PC camera to go. The versatile Intel® Pocket PC Camera lets you record 2 minutes of video and take up to 128 high-quality pictures either at or away from your PC. Included software lets you make enhanced video phone calls with friends and family over the Internet.

(A6750) GST Inc: **$379**




Ask about...

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- ☐ Extend to a total of 5 Years Return to Base
- ☐ Upgrade Return to Base to On-Site



## Intel® Pro PC Camera

One quality PC camera lets you make video phone calls and import video to your PC from your camcorder or VCR! The Intel® PC Camera Pro Pack with the versatile Intel® Pro PC Camera also lets you record video and take snapshots. Then do more with your pictures using the included suite of integrated software.

(B1990) GST Inc: **$295**




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## Intel® Deluxe PC Camera

Turn your PC into a video phone! The Intel® Deluxe PC Camera includes the Intel® PC Camera and fully-integrated software. Make video phone calls over standard dial-up, broadband Internet connection or regular telephone lines.* Capture video and stills to personalize email postcards. Fun camera games are also included. All in one affordable package.

*Requires Windows 98 and video-ready modem

(B4373) GST Inc: **$198**




MAR 30



## Intel® Easy PC Camera

With the Intel® Easy PC Camera, sharing pictures with friends and family over the Internet is a snap. You get a great PC camera and a suite of software for making video phone calls and sending personalized email post-cards.

(A6749) GST Inc: **$118**



3com

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# Connectivity where & when you need it

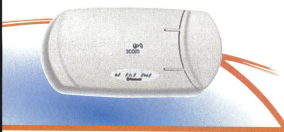
Connect your desktop or notebook PC, Palm handheld, mobile phone, LAN access point and other Bluetooth-enabled devices in a personal wireless network that's completely mobile and easy to use. Included software provides auto-discovery and point-and-click management of devices, resources, and services. Built-in authentication, encryption, and trust screening keep your data secure.

## 3Com® Bluetooth PC Card & USB Adapter



NEW Product to be RELEASED IN MARCH

## 3Com® Bluetooth Acess Point



Ethernet LAN access for up to seven Bluetooth enabled devices providing wireless network connectivity in the office, on campus and in public locations. Simple and secure operation, with up to 100 m range in free space. With no external antenna, the 3Com's access point installs easily, bringing flexible wireless connections whereever you need them.

NEW Product to be RELEASED IN MARCH



HARRIS TECHNOLOGY... for all your computer needs!

OfficeConnect Dual 56K LAN Modem brings low-cost, high-speed Internet and Ethernet connectivity to your Small Office/Home Office computers in just minutes! This product is designed for non-technical users that need radical simplicity, high speed Internet access as well as local file and print sharing capability.

(A3358) GST Inc **$780**

## 3Com® OfficeConnect™ Dual 56K Lan Modem



HARRIS TECHNOLOGY... Target. Ballarat (VIC), Camberwell (VIC) & Epping (VIC)

**Target Shoppers!** Not all products are in-store, but consulting & advice available on all items

## 3Com® OfficeConnect™ E-Mail Server



The Office Connect Email Server is an affordable, easy to install and use, email solution for SB networks that want to dramatically improve their internal and external communications. The complete software/hardware solution can be installed and configured within minutes by a person with no IT expertise using a web-based administration interface and it enables all network users to send and receive email from their desktop.

(B2950) GST Inc **$1,530**

MAR 31

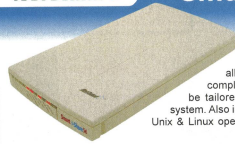
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# Australia's Leading Data Communications Products

## NetComm® Smart I-Share 56



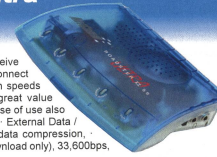
The smart internet sharing solution for the home or office using just one phone line and internet account. Router, 4 Port ethernet hub, 56k V.90 modem and firewall all in one small box. You can easily network your home or office computers with complete security and save time and money. It's built on a Linux kernel making it ready to be tailored to your business needs. Allows remote location dial up to your own network system. Also includes a serial port for an external ISDN or analogue modem. Works with Windows, Unix & Linux operating systems. 3 year warranty.

(A8868) GST Inc: **$435**



HARRIS TECHNOLOGY. for all your computer needs!

## NetComm® Roadster II 56 Ultra



The Roadster II 56 Ultra is a voice/data/fax modem which lets you transmit and receive faxes and data directly from your desktop. Get on-line in minutes. With UltraConnect technology built-in, this 56Kbps modem negotiates more aggressive transmission speeds which means you surf on a faster connection. The Roadster II 56 Ultra is a great value package to suit online gamers, small office user and the Internet power user. Its ease of use also makes it ideal for the first time user. · Supports Dual K56Flex & V90 Technology · External Data / Voice / Fax and Speakerphone modem · Slim-line design Error correction and data compression, · Distinctive Ring Simultaneous Voice and Data · Maximum speed of 56,000bps (download only), 33,600bps, V.34, V.32bis, V.42bis, V.42, MNP2-4, MNP5, MNP10EC, · Plug n' Play

(61194) GST Inc: **$195**

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## NetComm® Wave SP56



The revolutionary design of the Netcomm Wave takes up less desk space than almost any other product on the market. Allows you to use your PC just like a hands-free telephone with up to 9 password protected mailboxes. Dual V90 and K56flex compatibility. Simultaneous Voice & Data. Built in Speakerphone and VoiceMail. Digital line protection. Includes headset, desktop faxing and voice software.

(B1388) GST Inc: **$185**

## NetComm® Cyber Sentinel




Cyber Sentinel automatically filters & alerts via email against undesirable Internet traffic. It is the most advanced Internet monitoring software available. Includes Free Internet Access! Is ideal for home, school, library or office use. Protects against unwanted illegal downloads of pornography. Lets you decide what they access on the Internet, when they can access it and how much time is spent. Allows or denies access to email news groups, real time chat groups or web browsing by the individual user. Monitors all Windows-based applications in real-time.

(A8872) GST Inc: **$47**

MAR 32

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# Surround Yourself With The Very Best

## QuickCam™ Traveler

NEW!

QuickCam Traveler combines easy web communication with the freedom of a digital still camera.

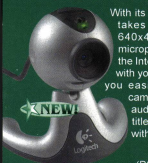
Take it on vacation, to sporting events or parties. It's loaded with features - like a self-timer, macro setting and storage for up to 200 shots. You can adjust resolution or delete duds, then instantly zap the shots into your computer.

QuickCam Traveler is also a video camera that plugs into your PC for all kinds of Internet video: video-conference, video-mail, video-greetings, live broadcasting, animation, even remote video surveillance! With the included video editing software, you can create titles and transitions, add music, narration, sound effects and more!



(A8024) GST Inc: **$268**

## QuickCam™ Pro 3000



NEW!

With its CCD sensor, QuickCam Pro 3000 takes pictures and videos with true 640x480 resolution. Use its built-in microphone to make live video calls over the Internet and send pictures and videos with your emails. QuickCam software lets you easily setup a digital surveillance camera and broadcast live video and audio over the web. Add professional titles, fades and wipes to your videos with the included MGI software.

(B0805) GST Inc: **$189**

## SoundMan SR-30



NEW!

Enhance your multimedia experience with realistic surround sound. Powerful subwoofer and 4 satellite speakers in an attractive package. Remote control with headphone jack.

2-year warranty.
(A5343) GST Inc: **$142**

## Cordless Wheel Mouse Special Edition

Personalise your mouse with the three different coloured snap-on backs (included). The Cordless Wheel Mouse frees you from cords that catch, tangle and limit your movement. The rounded shape is comfortable for left or right hand. 5-year warranty.



(A2300) GST Inc: **$69**

## MouseMan Wheel Optical

Work where you choose, with a mouse that goes anywhere, on desks, chair arms and almost any other surface. It records motion optically, without moving parts to clog up, skip and jump. The sleek, contoured four-button shape delivers maximum comfort and control. 5-year warranty.



(A3057) GST Inc: **$84**

## Cordless Freedom Navigator

Logitech's digital radio technology guarantees a reliability that other cordless devices just can't match. iTouch™ keys offer fast access to the Internet and multimedia. Includes Cordless MouseMan Wheel. 5-Year warranty.



(B1477) GST Inc: **$174**

NEW!

## Cordless Freedom Pro

Ideal cordless keyboard and mouse combination for exceptional comfort, cordless freedom and aesthetic design. The split layout with a gentle curvature makes it easy to use. iTouch™ keys for easy access to the Internet and multimedia. 5-Year warranty.



NEW!

(B1478) GST Inc: **$199**

## QuickCam Web

(A2833) GST Inc: **$163**



## QuickCam Express

(80121) GST Inc: **$82**



## Wheel Mouse Optical

(A5318) GST Inc: **$57**



## Cordless TrackMan FX

(B0831) GST Inc: **$160**



NEW!

## Internet Keyboard

(A8851) GST Inc: **$45**



MAR 33

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**Website:** www.ht.com.au
**E-mail:** sales@ht.com.au

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ServerLink™

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# Intelligent KVM Switches

## Control multiple PCs or network servers with a single monitor, keyboard & mouse

3 Year Warranty

**ServerLink to computer cable**
Each end of the cable fans out into three connectors.
2m cable for **PS/2** mouse, keyboard and monitor (63972) GST INC **$27**

5m cable (63976) GST INC **$60**

2m cable for **AT/Serial** mouse, keyboard and monitor (63974) GST INC **$26**

5m cable (63977) GST INC **$60**



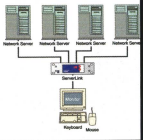
### What is a ServerLink KVM Switch?

The ServerLink range of Auto KVM switches allow you to take full control of multiple PCs or network servers with just one monitor, keyboard and mouse. There is no software to load – just plug in your computers, plug in your monitor, keyboard & mouse and you are ready to go. All ServerLink KVM switches are hardware only solutions totally independent of software and network operating systems. This ensures hassle free installation and error free switching & booting.



On Screen Display

- Select computers via On-Screen-Display or front panel
- Name computers for simple selection
- Mouse & keyboard emulation for flawless booting
- Scan Mode for periodic computer monitoring
- Standard cables used throughout
- Cascadable to control up to 256 computers
- 8 & 16 port models 19 inch rack mounted design
- Australian designed and manufactured




SERVERLINK INFINITY

PS-2 ONLY

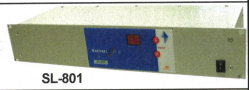
FROM **$270**


SL-421

| | | |
|---|---|---|
| **SL-221** | 2 Port ServerLink Infinity KVM Switch for PS/2 only | (B3047) GST INC **$270** |
| **SL-221-P** | 2 Port ServerLink Infinity KVM inc. 2 x 2m PS/2 cables | (B3048) GST INC **$310** |
| **SL-421** | 4 Port ServerLink Infinity KVM Switch for PS/2 only | (A9890) GST INC **$330** |
| **SL-421-P** | 4 Port ServerLink Infinity KVM inc. 4 x 2m PS/2 cables | (B2759) GST INC **$412** |
| **SL-821** | 8 Port ServerLink Infinity KVM Switch for PS/2 only | (97888) GST INC **$1,069** |
| **SL-821-P** | 8 Port ServerLink Infinity KVM inc. 8 x 2m PS/2 cables | (97889) GST INC **$1,239** |
| **SL-1621** | 16 Port ServerLink Infinity KVM Switch for PS/2 only | (97890) GST INC **$1,796** |
| **SL-1621-P** | 16 Port ServerLink Infinity KVM inc. 16 x 2m PS/2 cables | (97891) GST INC **$2,127** |

ServerLink™

PS-2 & AT/Serial


SL-801

| | | |
|---|---|---|
| **SL-401** | 4 Port ServerLink KVM Switch for PS/2 & AT/Serial | (63724) GST INC **$737** |
| **SL-801** | 8 Port ServerLink KVM Switch for PS/2 & AT/Serial | (63777) GST INC **$1,230** |
| **SL-1601** | 16 Port ServerLink KVM Switch for PS/2 & AT/Serial | (63778) GST INC **$2,069** |

MAR 34

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# Next Generation Backup Solutions

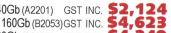
## Maxtor Storage Solutions

NEW!

### MaxAttach NAS System

**MaxA40:** 40Gb (A2201) GST INC. **$2,124**
**MaxA160:** 160Gb (B2053) GST INC. **$4,623**
**MaxC80:** 80Gb (A2204) GST INC. **$4,349**
**MaxC160:** 160Gb (A2205) GST INC. **$6,650**
**MaxC240:** 240Gb (A9090) GST INC. **$7,969**
**MaxC320:** 320Gb (B2051) GST INC. **$9,175**

*Simplest way to add a File Server to any NT or Unix Network.*



- Simply plug into your ethernet
- Only 5 mouse clicks to install....
- In 10 minutes you have upto 40, 80 or 160Gb of disk storage on line.
- Simple Web Browser administration.
- No NT licenses to buy!
- 95/98NT and Unix network compatible
- Now in 1 RU high models (4.5 cm high)
- Disk Spanning, JBOD or Raid level 1 built-in
- Free Reflect-It software to automatically backup you laptops or PCs.

### Maxtor Firewire Disk Drive Model 1394

**Max1394-40Gb External Disk Drive**
- 40 Gb Raw Ultra ATA Disk
- Firewire ready, or use PCI Card
- (B4381) GST INC **$665**

**Max1394-80Gb External Disk Drive**
- 80 Gb Raw Ultra ATA Disk
- Firewire ready, or use PCI Card
- (B4382) GST INC **$945**

**Max1394PCI Adapter Card for Windows 98/2000**
- 400 MB/sec Firewire Interface
- Mac and PC Compatible
- Plug and Play
- (B4383) GST INC **$120**



## More from Digital Tape Solutions



**Quantum DLT4000/ST**
(70917) GST INC **$2,832**

**Quantum DLT8000/ST**
(82501) GST INC **$7,158**

**DLTtape media DLT2000XT 15/30GB Tape**
(68362) GST INC **$80**

**DLT4000 20/80GB Tape**
(71231) GST INC **$155**

**DLTclean Cleaning Tapes**
(97851) GST INC **$93**


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Collect **Fly Buys** points on your computer hardware & software when you purchase from HARRIS TECHNOLOGY.


## ECRIX VXA-1 Tape Drive

**INTERNAL** (91106) GST INC
**$1,759**
**EXTERNAL** (91110) GST INC
**$1,995**
**EXTERNAL BUNDLE PACK**
Firewire interface and Retrospect software
(B1856) GST INC **$2,459**



- 33 GB Native, 66GB compressed
- 3-6MB sec sustained, that's 21.6GB/Hr
- SCSI-2 and LVD models available.
- Variable speed operation matches data throughput to your computer
- Packet based technology guarantees reliable restores
- LINUX and Apple Mac approved.
- Variety of case colours (*White, black, red, translucent)
- Compatible with most backup software

## Benchmark DLT1 Tape Drive






**INTERNAL**
(88037) GST INC
**$3,199**
**EXTERNAL**
(88038) GST INC
**$3,730**

- 40GB native, 80GB compressed
- 3-6MB sec sustained, that's 21.6GB/Hour
- Ultra Wide SCSI LVD interface
- Reads DLT4000 tapes (20/40Gb Only)
- Internal or External models
- LINUX Approved
- 7 tape autoloader available
- Compatible with most common backup software
- Standard DLT form factor

## Overland DLT1 Based Autoloader

NEW!



*"Lowest Cost DLT compatible Autoloader on the market"*

- 400 Gb native, 800 Gb compressed capacity
- DLT1 Single Tape Drive included
- 10 tape capacity
- Overland DLT reliability
- LVD 68 pin SCSI Interface
- Includes 1 data tape and cable
- 20 Gb/Hr throughput.
- Optional On-site warranty.

(A0476) GST INC **$9,140**


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**E-mail:** sales@ht.com.au



See Page 2 for Locations

iomega

Look here for labels, disk cases, carry cases, Zip Tools...

Web Direct www.ht.com.au/cat/iomega

# Smart Storage Solutions

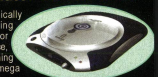
## HipZip
**NEW**



Announcing Iomega's new HipZip™ Digital Audio Player. With its sleek design, this palm sized player lets you download your favourite MP3 & Windows Media format tunes from the internet, & play them anywhere. The HipZip™ also acts as a PocketZip storage device; download & transport music, spreadsheets, images, etc, up to 40MB per disk.

(B1436) GST Inc: **$545**

## Predator
**NEW** Iomega Predator CD-RW drive



Introducing "Predator" - the new, radically designed, compact-sized, top-loading Iomega external CD-RW Drive. Predator is simple to set up using the USB interface, and includes loads of new award winning software, including MusicMatch and Iomega Quik Sync 2, and more.

**Predator™ USB Iomega CD-RW External** (B4416) GST Inc: **$590**

**Iomega CD-RW™ USB External 4x4x6** (92623) GST Inc: **$475**

## Iomega CD-RW



Iomega ZipCD Internal drive is the ideal way to store, share and archive information in a common 650MB format. Compatible with Windows 2000. Also ships with Adaptec Easy CD Creator v4.02c and Direct CD 3.01.

**12x4x32** **12x10x32**

(A5391) GST Inc: **$605** (B0882) GST Inc: **$570**

## Zip NEW
**Host-powered Zip 250MB USB**



The Zip® 250 USB drive is now available with a USB cable that provides both data and power, so you don't need any external power source. Powered by a USB cable, its easy to connect (just plug it in) and easy to launch (no rebooting). The Zip 250 USB host-powered drive also comes with the new U-shaped Zip® 250MB disk, and includes a trendy drive pouch.

(82633) GST Inc: **$369**

## QuikSync2




Back up your files without any hassle. Every time you save a file to your hard drive or to a network drive, Quik Sync 2 software automatically makes a copy of that file on an Iomega disk. All you have to do is select folders for the software to monitor. Quik Sync 2 is compatible with Zip, Jaz, PocketZip and Iomega CD-RW drives.

(B4408) GST Inc: **$40**

## PocketZip
**PC Card Drive**



Removable solution for notebook users. Store, protect and share important information on a 40MB PocketZip (1 disk included).

**USB docking station**

(A2306) GST Inc: **$89** (76743) GST Inc: **$415**

**Drive PC card & disk**

(78902) GST Inc: **$190** (75985) GST Inc: **$175**

| | |
|---|---|
| Zip 100MB disk: (23772) GST Inc: | **$25** |
| 10-pack: (21889) GST Inc: | **$190** |
| Zip PCMCIA SCSI accelerator card (35145) GST Inc: | **$170** |
| Zip ISA SCSI Zoom accelerator card (21888) GST Inc: | **$85** |
| Zip drive carry case (31823) GST Inc: | **$44** |
| Zip parallel cable (46305) GST Inc: | **$35** |
| Zip SCSI cable (46304) GST Inc: | **$35** |
| Zip disk labels 20-pack (48059) GST Inc: | **$5** |
| Zip 6-disk wallet (35146) GST Inc: | **$23** |
| Jaz 2GB External Drive (78941) GST Inc: | **$645** |
| Jaz 2GB disk (61652) GST Inc: | **$205** |
| Jaz 2GB 3-pack (57271) GST Inc: | **$550** |
| Jaz 1GB disk (24218) GST Inc: | **$199** |
| Jaz 1GB 3-pack (32844) GST Inc: | **$495** |
| Jaz PCMCIA SCSI card (44744) GST Inc: | **$215** |
| Jaz universal power supply (35154) GST Inc: | **$55** |

You have the chance to win instantly with Zip media. Until April 31, all Zip media 2 pack and 10 pack discs give you the chance to win on the web. You can win an Iomega **HipZip**, Digital Audio player, or a **Predator** CD-RW drive instantly. Every entry goes into the draw to win a World trip valued at upto $8000. Check Zip media packs for more details.




MAR 36

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# Professional Video Tools

## Hauppauge TV




(89063) GST INC **$149**

• Watching Television on your computer has never been easier with WinTV • Watch Live TV (16 Channels) or video on your PC while surfing the Web • Capture motion video and high quality video stills 1600x1200 pixels, BMP, TIF, TGA, GIF, JPEG formats • Video clip capture in Microsoft AVI file format - from TV or any video source • Video conference over the Internet with Microsoft NetMeeting or CU-SeeMe • Win 95, 98, NT 4.0, Win2000 and Linux.

**Hauppauge TV GO- FM** (89064) GST INC **$209**
**Hauppauge TV USB** (89066) GST INC **$270**
**Hauppauge TV USB (with FM Radio)** (98455) GST INC **$314**
**DV Wizard** (A8925) GST INC **$267**

## Hauppauge PVR

### Personal Video Recorder (MPEG2)




- Watch and record your TV shows with instant replay and program pause
- Burn your favorite TV shows onto CD- ROM
- Watch TV on your PC, in a window or full screen
- Pause your TV shows, replay them at any time!
- Record your TV shows to hard disk using high quality MPEG2 compression!
- Burn your TV shows onto CD, play them back on your PC, laptop or DVD player!
- Includes FM stereo radio and IR remote control!

NEW **PCI** (B2593) GST INC **$580**



HARRIS TECHNOLOGY™ for all your computer needs!

## canopus EZDV




• Rock Solid DV Codec - Only from Canopus • Compatible with DV & Digital8 cameras • Frame accurate camera control • Easy to learn & use EZEdit software (included) • Captures selected clips or complete videotapes • High speed rendering • SoftXplode 2D & 3D special effects software (included) • High Speed filtering & image enhancements

(97877) GST INC **$595**
**EZDV PLUS with Media Studio Pro (V6.0)**
(A8924) GST INC **$795**

**DVRaptor and EZDV now include SoftMPG. Canopus high quality MPEG1 & 2 encoding software allowing easy creation of VCD and DVD compliant video files. PLUS! EZDV is now available with Adobe Premiere!**

Web Direct

See Web Direct Link (at top of page) for more products and latest info!

## DVStorm

Introducing DVStorm, a real-time DV editing system that combines a high performance feature set with stability, reliability, and affordability. Boasting render-free, real-time digital video editing, DV and Analogue input/output, MPEG output for DVD, plus Web streaming capabilities, DVStorm is the ultimate digital video editing experience!




DVStorm (B4401) GST INC **$3,207**

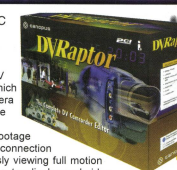
DVStorm & Adobe Premiere (B4406) GST INC **$3,499**

Mpeg Hardware Module (B4402) GST INC **$1,144**

## DV Raptor

(A8997) GST INC **$1,199**

The DVRaptor is a next generation DV and i.LINK card which links your DV camera to your PC. With the Raptor you can capture your DV footage through the i.LINK connection while simultaneously viewing full motion video on your computer display and video monitor.




**with Adobe Premier 5.1**
(89050) GST INC **$1,290**



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**Fax:** 1300 13 6666
**Website:** www.ht.com.au
**E-mail:** sales@ht.com.au

See page 2 for locations

# Copying and Connectivity

HARDWARE HARDWARE HARDWARE

## Verbatim CopySmart One to One CD Duplicator

### 8x Record, 4x ReWrite, 32x Read




8x Record, 4x ReWrite, 32x Read Stand Alone Duplicator. Introducing the simplest and most affordable way to duplicate a low volume of CD-R or CD-RW discs. Place your original CD in the 32x CD-ROM drive, a blank CD-R or CD-RW in the recorder and then just press start to duplicate the CD-ROM. The CopySmart can also be connected to a Mac or PC for use as a standard external reader/writer.
PCI SCSI card and connecting cable included.

(B2904) GST Inc **$1,397**

## Verbatim Signature III InkJet CD Printer



(89186) GST Inc **$2,850**

## Verbatim Inscripta Thermal CD Printer



(B2932) GST Inc **$5,525**

## Verbatim Composer Autoloading CD Duplicator

(B2933) GST Inc **$4,763**

Optional Inscripta or Signature III printer available.



Conductor-autoloader (B2934) GST Inc **$2,965** only for Signature III or Inscripta Printer

## Verbatim PCI Firewire Cards




Update your PC with firewire! With the included Ulead Video Software and cable you can download directly from digital video camera to your hard drive. Repeater hubs and cards also available.

| | | | |
|---|---|---|---|
| PCI Firewire Card – 4 ports | (90689) | GST Inc | **$172** |
| PCI Firewire Card – 6 ports | (A5161) | GST Inc | **$216** |
| PCI Firewire Repeater Card – 5 port | (A5162) | GST Inc | **$180** |
| PCI Firewire Repeater – 6 port | (A5163) | GST Inc | **$154** |
| PCI Firewire Repeater – 10 port | (A5164) | GST Inc | **$204** |
| 6 pin to 6 pin Firewire cable | (B2905) | GST Inc | **$33** |

## Verbatim USB Hubs & Cards




USB has been designed to allow many devices to be connected in a very easy way to a PC or MAC. Most new PC's have USB, but plug-in cards can add USB ports to older machines. The use of a hub enables a single cable to be expanded to as many as 6 cables.

| | | | |
|---|---|---|---|
| USB Hub – 6 ports | (79702) | GST Inc | **$99** |
| PCI USB Card – 2 ports | (84801) | GST Inc | **$49** |
| USB Network Cable | (B2908) | GST Inc | **$75** |
| USB to Printer Cable | (84803) | GST Inc | **$33** |
| Internal 3.5" USB Hub – 4 ports | (B2909) | GST Inc | **$99** |
| USB to 10/100 Ethernet Adapter | (B2912) | GST Inc | **$119** |

## Verbatim PCI SCSI Cards




Expand and enhance your PC with a PCI SCSI Card. Common IDE drives in today's PC's slow down your machine every time they read or write to a drive. SCSI works almost completely independently of your PC allowing it to run faster during drive activity.

| | | | |
|---|---|---|---|
| PCI Bus, Ultra-SCSI | (90681) | GST Inc | **$89** |
| PCI Bus, Ultra-Wide | (90683) | GST Inc | **$168** |
| PCI Bus, 2 channel Ultra-Wide | (90684) | GST Inc | **$366** |
| PCI Bus, Ultra2-Wide | (90685) | GST Inc | **$277** |

## Verbatim IDE Acceleration & Expansion Card




**PCI IDE Ultra DMA 100 Card:** Speed up your PC's new hard disk drives with this PCI plug in Ultra DMA 100 card. Supports transfer speeds of up to 100MB/s with new ATA100 drives, and includes the ability to run up to 4 extra IDE or ATAPI drives on your system.

PCI IDE Ultra DMA 100 Card (90688) GST Inc **$77**



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## Backup and Portable Storage

HARDWARE HARDWARE HARDWARE

### Verbatim MirrorSmart - UltraWide SCSIDE Raid Mirror Subsystem

NEW



The MirrorSmart provides complete protection for your important files. Uses RAID1 to allow disk mirroring and rebuilding functions. You will never have to worry about hard disk failure again with the MirrorSmart – providing high data security for a low cost. Features: • Drive Hot SWAP and instant rebuild • Built-in RAID On a Chip(ROC) SCSIDE engine• Uses standard IDE Hard Drives

(B2913) GST Inc **$1,079**

### Verbatim Digital Memory - CompactFlash



With CompactFlash Digital Film you can increase the storage capacity of any compatible digital camera or PDA. CompactFlash card adapters convert CompactFlash into the PCMCIA Type II Card format.

| | | |
|---|---|---|
| 8MB CompactFlash | (B2919) | GST Inc **$66** |
| 16MB CompactFlash | (B2920) | GST Inc **$78** |
| 32MB CompactFlash | (B2921) | GST Inc **$140** |
| 64MB CompactFlash | (B2922) | GST Inc **$244** |
| 128MB CompactFlash | (B2923) | GST Inc **$520** |

### Verbatim Digital Memory - SmartMedia

SmartMedia cards expand the storage capacity of any compatible digital camera. The SmartMedia Card Adapter converts SmartMedia Cards into the PCMCIA card standard and is compatible with PCMCIA Type II sockets.



| | | |
|---|---|---|
| 8MB SmartMedia | (B2914) | GST Inc **$44** |
| 16MB SmartMedia | (B2915) | GST Inc **$78** |
| 32MB SmartMedia | (B2916) | GST Inc **$140** |
| 64MB SmartMedia | (B2917) | GST Inc **$292** |
| SmartMedia Card Adapter | (B2918) | GST Inc **$109** |

### Verbatim FlashPath Floppy Adapters



**Works from your PC's Floppy Disk Drive.**
FlashPath is an electronic device shaped like a floppy diskette – it fits into and works from a 3.5" floppy disk drive allowing you to easily transfer data from your flash media card to your PC by simply using your existing floppy disk drive.

| | | |
|---|---|---|
| FlashPath SmartMedia Reader | (B2924) | GST Inc **$160** |
| FlashPath MultiMediaCard Reader | (B2925) | GST Inc **$160** |

### Verbatim Digital Card Drives

NEW!

Exchange data between your PC, laptop, or Digital Camera with our range of PCMCIA Readers/Writers.



| | | |
|---|---|---|
| USB Port SmartMedia and Compact Flash Card Drive | (B2926) | GST Inc **$95** |
| USB Port ATA Card Drive | (96056) | GST Inc **$99** |
| Parallel Port ATA Card Drive | (A0064) | GST Inc **$99** |

### Verbatim Slim-line PC Card CD-ROM Drive

*Add a CD-ROM to your Laptop!*



This 24x CD-ROM can connect to any PC Card enabled PC or Notebook and is ideal for mobile computing for notebook users with no CD-Rom drive built-in. The drive is plug-and-play making installation a breeze and the slim-line tray reduces the size of traditional external PCMCIA CD-ROM drives through its lightweight and low profile design. The control panel on the top of the case allows for easy playback of audio CD's.

(97766) GST Inc **$315**

### Verbatim CompactFlash v.90 56k Fax Modem



Add full 56k modem capabilities to your Palmtop or handheld Windows CE device. Browse the internet or collect your email from any remote location with a normal phone line.

(B2929) GST Inc **$280**

### Verbatim Slim-line PC Card DVD-ROM drive.

Ideal for mobile multimedia applications, 8x DVD-ROM drive & 24x CD-ROM reader.



(B2931) GST Inc **$700**

### Verbatim PCI Cards

Add super fast serial and parallel port interfaces to any PCI equipped PC. Priced from **$77**







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## CD-R/CD-RW: Storage for life

MEDIA MEDIA MEDIA MEDIA MEDIA

Verbatim CD's represent the latest in technology. Featuring a proprietary blue Metal-Azo dye which has the best resistance to sunlight, silver reflective layer for optimum read and write performance and multispeed recording.

## Verbatim CD Recordable and Rewritable Discs

### CD Recordable - 10 Pack




74 Min. 650 MB
1x - 16x, 10 pack

(B4329) GST Inc:
**$17**

NEW!

### Audio CD Recordable and Rewritable




74 min recordable
74 min rewritable

(B4327) GST Inc:
**$5**

### CD Recordable - Singles

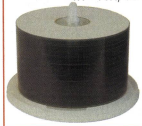
74 Min. 650MB 1x - 16x Singles




(74740) GST Inc:
**$2**

### CD Recordable - Printable Surface

74 Min. 650 MB Printable Surface
1x - 16x, 50 spindle pack



(93471) GST Inc:
**$79**

*Printable surface also available in jewel-case

### CD Recordable - 80 Minute Colors




80 Min. 700MB,
1x-12x, colored CD-R's in matching superslim cases
25 pack

(B1355) GST Inc:
**$39**

### CD Recordable - 80 Minute




80 Min. 700MB,
1x - 16x, 10 Pack

(B1354) GST Inc:
**$19**

700MB

### DataLife Floppy Diskettes



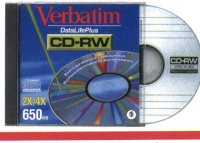

The world's No 1 Floppy Disk
DSHD IBM format 3.5" Floppy Disks

11th Disk FREE!

(79452) GST Inc:
**$6**
*comes in pack

### CD ReWritable

650MB CD Rewritable 2x-4x




(77492) GST Inc:
**$4**

650MB CD Rewritable High Speed 4x-10x
(B2658) GST Inc
**$6**



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# The Future of USB is Here...

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## USB Hub

F5U101



**A Belkin USB 4-port hub!** This compact modular hub allows you to connect 4 USB devices to a single USB port, and it fits almost anywhere. Take advantage of full Plug-and-Play capability to make installation a breeze!

(96865) GST Inc: **$105**

## Firewire PCI Card

F5U501



**Capture your world in digital video!** The IEEE 1394 PCI Card transforms your desktop PC into a digital-video editing bay adding FireWire® capabilities to PCs without FireWire® ports, or for current users desiring extra ports on an existing FireWire® system. Also Includes MGI's VideoWave™ III SE video-editing software!

(A7792) GST Inc: **$145**

## USB Direct Connect

F5U104



**With the Belkin Direct Connect** you can play multiplayer games at speeds up to 150 times faster than a 56K modem. Now you're really cooking! Join computers without any networking hassle. Simply plug the Direct Connect in and the installation program does all the work for you.

(96890)

GST Inc: **$125**

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EXTENDED HARRIS TECHNOLOGY WARRANTY

- ☐ Extend to a total of 3 Years Return to Base
- ☐ Extend to a total of 5 Years Return to Base
- ☐ Upgrade Return to Base to On-Site

## USB VideoBus II

F5U208



**Captivate your audience with exciting graphic effects.** You create the show yourself with your PC and camcorder merged into a desktop video studio by the Belkin USB VideoBus II. The Belkin USB VideoBus II, complete with MGI VideoWave III SE software, gives your PC the power to make stunning movies and more!

(B4412) GST Inc: **$145**

## USB Cable

F3U133



**A Belkin Pro Series USB device cable** will keep those dream machines error free. Features high performance 20-gauge power wires that allow you to maximize the full potential of USB.

**USB Device Cable,**
A-B, 1.8m - (96893) GST Inc: **$14**
A-B, Gold 1.8m - (96875) GST Inc: **$18**

**USB Extension Cable,**
Male-Female, 1.8m - (96895) GST Inc: **$16**
Male-Female, Gold 1.8m - (96878) GST Inc: **$18**

Also available in colors: blue grape, lime, tangerine, & strawberry

## Printer Cable

F2A046



**This Belkin IEEE 1284 compliant printer cable will keep that dream machine error free!** Featuring our exclusive wiring design and cable technology that guarantees optimal performance and data transfer ten times faster than non-IEEE 1284 cables

IEEE 1284 Parallel Printer Cable:
A-B, 3m - (96929) GST Inc: **$35**
A-B, Gold 3m - (96930) GST Inc: **$45**

# BUSlink

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## BUSlink Hard Drive. Technology the easy way.







Stand the drives upwards to save desk space, and for extra hard dsic storage, simply stack up more BUSlink FireWire Hard Drives.

BUSlink FireWire Hard drive is a fast, easy way to add additional storage to your computers. You simply plug it into any IEEE 1394 enabled computer. Of course, it is Hot Swap capable! BUSlink FireWire is 30 times faster than those USB hard drives. Making BUSlink FireWire Hard Drive ideal for digital video editing and any high speed, high capacity hungry tasks.

12 Month Warranty. No drivers necessary, package includes card and cables.

**20Gb Package**

(B4518) GST Inc: **$649**

- AVI, movie storage
- back up
- file storage
- games storage
- portability
- MP3 file storage
- photo storage

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MAR 41


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# Kodak

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## Taking Pictures Further

**Fly Buys.**

Collect **Fly Buys** points on your computer hardware & software when you purchase from HARRIS TECHNOLOGY.

### Kodak DC4800

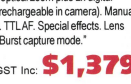



For passionate digital photographers or those needing the highest possible quality or the widest creative control. Compact size. 3.3 megapixels - super crisp resolution allowing prints up to 11"x17". Six image qualities, from e-mail to uncompressed Tif. Loaded with features. Variable ISO settings (100, 200, 400). Wide angle 3x optical zoom plus 2x digital zoom. Lithium Ion rechageable battery (rechargeable in camera). Manual & auto settings. Variable colour balance. TTLAF. Special effects. Lens threaded for additional external lenses. Burst capture mode.*

(A3295) GST Inc: **$1,379**

### PM200 Printer

NEW!



The most distinctive feature on the Personal Picture Maker 200 is its 1.8-inch, full-colour, LCD preview screen just like those on digital cameras. You don't even need to be connected to a PC, you just insert a memory card from a digital camera (the PPM200 accepts both Smart Media and Compact Flash formats) to print. The preview screen allows you to scroll through all the images on the card, select those to print, choose the number of copies, and in what size and layout. Compatible with Microsoft Windows 98 and Millennium Edition, it connects easily via a USB port.

(B3084) GST Inc: **$535**

### Kodak

NEW!




The KODAK DC3800 Digital Camera is the sleek, high-performance, easy-to-use digital camera. Its small size makes it pocket-perfect. The 2.1MP resolution delivers detailed, vibrant pictures on screen and paper. And the 2X digital zoom lets you focus on what's important. The USB COMPACTFLASH Card Reader makes it easy to upload your pictures and its point-and-shoot design makes it user-friendly.

(B1252) GST Inc: **$710**

**Kodak Accessories**

**32MB Picture Card**
(62677) GST Inc:
**$176**

**64MB Picture Card**
(82249) GST Inc:
**$272**

**96MB Picture Card**
(88332) GST Inc:
**$426**

**Premium Camera Bag**
(82273) GST Inc:
**$62**

**80 Minute Ultima**
(94493) GST Inc:
**$2**

**Kodak Gold 10 Pack**
(53993) GST Inc:
**$20**

### Kodak DC3400




• Two-megapixel resolution means exceptional detail and brilliance – up to 8" x 10" prints. • Its 2X optical zoom delivers crisper close-ups, and its 3X digital zoom lets you get even closer. • User-friendly controls make the DC3400 quick to learn & easy to use. • Zoom Digital Camera, ensuring high quality & no-nonsense performance. • Get connected quickly & easily with its USB and serial cables - it's easy to download, organize, and e-mail your pictures. • Print your pictures with convenience from your own printer.

(A5579) GST Inc: **$812**

### Kodak DC5000




Rugged, durable, and easy-to-use, the KODAK DC5000 will help you get the job done. The DC5000's weatherproof body will hold up under the toughest circumstances. Two-megapixel resolution provides you with excellent picture quality even on 8" x 10" prints. The 2X optical (30 – 60 mm) and 3X digital zoom let you choose wide angle or telephoto to take pictures in a variety of open spaces. All in all, a practical, intuitive package that is as easy to use as a point & shoot, but tough on the job

(A3540) GST Inc: **$1,049**

### Kodak EZ200




Low cost digital point-and-shoot camera that's also a PC/web camera. Compact & light. VGA camera - ideal for easily emailing pictures. Capture short video clips and share via video email. Portable like a traditional camera, but included software also allows camera to be tethered to PC for live video calls. Burst mode for action shots. USB interface. 4Mb internal memory. With removable/adjustable base to allow full tilting & swivelling.

(A7287) GST Inc: **$245**

### Kodak DC3200




Capture fun and spontaneity with the DC3200. One megapixel resolution means eye-catching e-mails and prints up to 5" x 7". Its 2X digital zoom delivers great detail. Two megabyte internal memory and COMPACTFLASH Card capability keeps you shooting longer. And its LCD screen lets you preview your pictures with ease.

NEW!

(B1255) GST Inc: **$450**

MAR 42

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**Finance methods are subject to approval.**

# Canon

Web Direct www.ht.com.au/cat/canon

## Can on a Canon, Can Do!

### BJC-1000SP

**Super Economy Mode in Black/White & Colour**

- Vivid colours, on plain paper.
- Photo Mode colour, optional PhotoRealism.
- Auto image improvement.
- Print banners, up to 6 A4 pages, envelopes, transparencies, glossy photo paper, high gloss film & T-shirt transfers.



(A1792) GST INC **$99**

### BJC-2100SP

**High performance at a low price - the ultimate printer!**

- Ultra compact design.
- Up to 5ppm in monochrome.
- Up to 2ppm in colour.
- 4-colour photo printing.
- Optional colour image scanning.
- Range of driver features.
- Banner printing.
- USB + parallel interface.



(A3173) GST INC **$137**

### LBP1000



10 PPM
1200 dpi
PCL6
4 MB RAM

(95983) GST INC
**$1,060**

### A4 BJC- 3000



(94499) GST INC
**$225**

- Up to 9ppm print speed black
- 1440 dpi
- Separate replacement colours

### A3/A4 BJC- 6500



(95962) GST INC
**$579**

### BJC-6200

**Compact design and uncompromised performance!**

- 6-colour photo printing.
- Optional colour image scanning.
- Separate colour ink cartridges!
- Up to 10ppm in monochrome.
- Up to 7ppm in colour.
- USB + parallel interface.
- 1440 x 720 dpi.



(A3507) GST INC **$335**

### LBP800

**8ppm Desktop laser**

- 300x300dpi, 600x600dpi
- 2,400dpi with text & line smoothing.
- 2,500 pages per cartridge (5% cover).
- 512K buffer.
- Win® 95, 98 and NT 4.0.



(83787) GST INC **$485**

### N340P



300x600dpi
(A8919) GST INC
**$99**

A4 Colour parallel flatbed scanner. Fast 1 pass scanning. Unique LIDE contact image sensor technology. 600x1200dpi. Incredibly thin (39mm),

### MOST COMPACT, LIGHTWEIGHT FLATBED SCANNERS AVAILABLE!

- OmniPage OCR software included (N650U & N1220U Only) Full V9.0
- Plug & Play
- Fully integrated software package

NEW RANGE!



- Silent & fast scanning
- Super slim & compact

### D660U



With 42 bit output for Windows 98, 2000 and USB Mac Systems. Fast one pass USB scanning. 600x1200dpi film scanning via **film adaptor built-in to scanner lid.**

1200x2400dpi
(A8903) GST INC
**$250**

### N640P



1200x2400dpi
(A7655) GST INC
**$128**

### N650U

600x1200dpi.
(A3522) GST INC
**$160**

### N1220U

1200x2400dpi.
(A3523) GST INC
**$245**

### FB1210U

1200x2400dpi
(A3524) GST INC
**$419**



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# Complete home solutions

## HP Papers

**Premium Plus Photo Paper**
Glossy A4, 20 sheets
(84904) GST Inc: **$29**

**HP Premium Photo Paper**
A4, 15 sheets
(54010) GST Inc: **$16**

**HP Premium Photo Paper**
A3, 20 Sheets
(58635) GST Inc: **$62**

## HP DeskJet 640C

$25 MAIL-IN REBATE



**HP's easy, everyday colour inkjet printer**

- Black and colour cartridges included - everything you need!
- Great results on plain paper
- Special projects made simple - greeting cards, envelopes & more
- Prints up to 6 ppm black and 3 ppm colour

(A2288) GST INC **$170**

## HP DeskJet 840C

$25 MAIL-IN REBATE

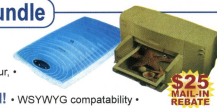


**HP's creative photo-quality colour, speed & flexibility**

- Photo-quality with HP PhotoREt II
- Alternative 600x1200 dpi mode on photo paper
- Prints up to 8 ppm black and 5 ppm colour
- Exclusive HP inks dry fast for smudge-resistant text and images

(A2289) GST INC **$259**

## HP DeskJet 840C + HP Scanet 3400C Bundle



$25 MAIL-IN REBATE

**HP DeskJet 840C: HP's creative photo-quality colour, speed & flexibility** • Photo-quality with HP PhotoREt II, • Alternative 600x1200 dpi mode on photo paper, • Prints up to 8 ppm black and 5 ppm colour, • Exclusive HP inks dry fast for smudge-resistant text and images.

**+ HP ScanJet 3400C: Easy scanning, copying & e-mail!** • WSYWYG compatability • Dual I/O: USB & Parallel interface • 600 dpi optical • 36 bit colour • Precision Scan LTX software

(B1553) GST INC **$430**

## HP ScanJet 3300C

LOW PRICE

$25 MAIL-IN REBATE



**Easy scanning and copying**

- Color copy or scan at the touch of a button
- Quick and easy setup with USB installation
- IncludesHP ScanJet Copy Utility and Adobe® PhotoDeluxe™ 3.0 image editing and creative projects software
- HP PrecisionScan LT with integrated OCR makes it easy to scan editable text in minutes

(81725) GST INC **$174**

**$25 MAIL-IN REBATE**

**Purchase a HP Deskjet 640C, 840C, Scanjet 3300C, 3400C, 4300C, or 840C/3400C bundle and receive a $25 mail-in rebate.** *Valid 15/01/01 through 31/03/01 or while supplies last; which ever occurs first. Claims must be received no later than Midnight 30 April 2001*

## HP ScanJet 3400C

LOW PRICE

$25 MAIL-IN REBATE



**Easy scanning, copying and e-mail!**

- WSYWYG compatability
- Dual I/O: USB & Parallel interface
- 600 dpi optical
- 36 bit colour
- Precision Scan LTX software

(A2285) GST INC **$215**

## HP ScanJet 4300C

LOW PRICE

$25 MAIL-IN REBATE



**Scan/copy/e-mail from a brand you can trust**

- WYSWYG compatability
- Dual I/O: USB & Parallel
- 600 dpi optical - 36 bit colour
- Windows 2000 support
- Precision Scan LTX software
- Corel Print House 2000

(A2286) GST INC **$259**

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# HP OfficeJets, DeskJets & CDRW

## HP OfficeJet 725

LOW PRICE

1. Send color faxes when PC is on or B&W faxes any time.

2. Scan color documents to email in one step. Outstanding resolution and photo quality color enable you to create professional documents.

3. Four office products (printer, fax, scanner and copier) in the space of one.

4. Intuitive controls make it easy to use right out of the box.

5. Easy software makes switching between tasks simple.

6. Trade faxes in color with any other color fax machine!

7. Backed by Customer Care



(80568) GST INC **$499RRP**

Ask about...

EXTENDED PARTS & LABOUR WARRANTY

- ☐ Extend to a total of 3 Years Return to Base
- ☐ Extend to a total of 5 Years Return to Base
- ☐ Upgrade Return to Base of Warranty Extension to On-Site

## HP OfficeJet G85

**All Colour: Printer, Copier, Scanner & Fax**

The OfficeJet G85 not only provides incredible printing, scanning and copying but is also a fully featured colour standalone fax.



(A0062) GST INC **$1,299**

## HP CDRW 9140i & 9500i

| Model | 9140i | 9500i |
|---|---|---|
| **Speed** | **8x4x32** | **12x8x32** |
| Copy & create universally readable CDs | HP MyCD | HP MyCD |
| CD creation using drag & drop | Adaptec Direct CD 3.01 | Adaptec Direct CD 3.01 |
| High speed CD-RW disc formatting | HP Fast Format | HP Fast Format |
| Full system backup | HP Simple Backup | HP Simple Backup |
| Multimedia organiser | | Broderbund Multimedia Pro |
| Create stationery, greeting cards & more | | Corel Print Office 2000 |
| MP3 downloads | HP Music Jukebox | HP Music Jukebox |
| CD labelling | CD labeler | CD labeler |
| **Included media** | 1xCD-R | 1xCD-R, 1x high per, CD-RW |
| **Buffering** | 2MB | 4MB |
| Able to create all type of CDs | Yes | Yes |
| Able to format CD-RW disc under 3 minutes | Yes | Yes |
| Able to do a full system backup | Yes | Yes |
| Download MP3 files & store on CD | Yes | Yes |
| Download MP3 files onto CD to play in a discman | Yes | Yes |
| A solution with a CD labeler | Yes | Yes |
| Write & read high performance CD-RWmedia | Write- No, Read- Yes | Yes |
| Write & read normal CD-RW media | Yes | Yes |
| Write & read CD-R media | Yes | Yes |
| **Part #** | (A8090) | (A8087) |
| **Inc GST** | **$379** | **$560** |



**Easiest to Install & Use!**

You can create data CD's, audio CD's, photo CD's and multimedia CD's. You can either write once (CD-R) or erase and re-write (CD-RW). Each CD holds up to 650MB if data or 74mins of audio.

Web Direct

See Web Direct Link (at top of page) for all your HP ink and paper needs



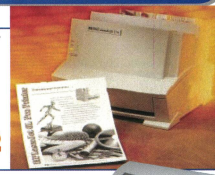


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# LaserJet and InkJet Printers

## HP LaserJet 6l pro

HOT NEW PRODUCT



•6ppm • economode cuts printing costs by 50% • power save mode reduces energy costs • 18-second first page out • patent instant-on fuser eliminates printer warm-up time • fast return to application • supports a wide variety of media sizes and types (letter, envelopes, transparencies and card stock) • Supports DOS and Windows 3.1, 3.11,95,98,NT 4.0 environments

(B4399) GST INC **$642**



HARRIS TECHNOLOGY. for all your computer needs!

## HP InkJet 2250/2250TN

**2250** (A3362) GST INC **$1,345** **2250TN** (A3363) GST INC **$1,929**

The HP Business Inkjets 2250 and 2250TN come with all the features of the 2200, and also include: • HP PCL5Ce, HP PostScript level 2 emulation • 24MB RAM upgradeable to 88MB • Two 96MHz Motorola processors on board • HP JetDirect 600N internal print server (2250TN only) • Additional 250-sheet input tray (2250TN only)



## HP Business InkJet 2200

(A3361) GST INC **$955**

The HP Business Inkjet 2200 has a higher print speed (normal mode) than any other HP inkjet. And, like the other two printers in the range, it's extremely cost effective. • 15ppm black printing, 14ppm spot colour printing, • HP PhotoREtIII • HPA™ installed • 250-sheet input tray • 8MB of memory • One 96MHz Motorola processor on board



**Choose your office Goodies!**

Purchase any of the selected HP LaserPrinters between 17/01/01 & 31/03/03 and you can choose your goodies, which include Extended warranty, genuine HP supplies, see claim form or www.hp.com.au for more details

## HP LaserJet 1100 Printer

**1100 Printer** (70095) GST INC **$709**

**1100A Printer- Copier- Scanner** (70096) GST INC **$845**

HP's JetPath technology allows you the flexibility to expand the LJ 1100 into an all-in-one performer when your business needs grow. Crisp, sharp 600dpi laser printing. 8ppm. 2MB RAM.



## HP LaserJet 4550 Series

**HP Colour Laserjet 4550** A4 16PPM 64Mb (B2381) GST INC **$3,915**

**HP Colour Laserjet 4550N** A4 16PPM 64Mb 10/100 (B2381) GST INC **$4,429**

The HP Color LaserJet series printers are ideal for professional end users in workgroups and business departments who need to create documents which offer a competitive advantage in selling their ideas, products or analysis to external customers or internal managers through proposals, reports and newsletters.



## HP LaserJet 2100 Series

**LaserJet 2100** A fast flexible laser with room to grow. EIO, PCL 6, 4MB RAM. (72291) GST INC **$1,249**

**LaserJet 2100M** A fast flexible laser with PS and PCL. EIO, PCL 6, 8MB RAM. (72292) GST INC **$1,409**

**LaserJet 2100TN** A complete network printer. EIO, PCL 6, 8MB RAM, additional 250-sheet feeder, HP JetDirect print server installed. (72293) GST INC **$1,659**



***All models feature:***

- 1200dpi resolution
- 10ppm print speed
- 60MHz processor
- 350-sheet capacity
- 15,000 page monthly duty cycle
- Excellent performance

## HP LaserJet 4050 Series

**LaserJet 4050** PCL 6, 8MB RAM. (77443) GST INC **$2,009**

**LaserJet 4050N** PCL 6, 16MB RAM. (77445) GST INC **$2,499**

**LaserJet 4050TN** PCL 6, 16MB RAM (77446) GST INC **$2,999**



***All models feature:***

- 1200dpi resolution
- 16ppm print speed
- 133MHz processor
- 500-sheet capacity



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AGFA imaging

Web Direct www.ht.com.au/cat/agfa

# New Tools for the "E" Generation

## SnapScan e25 USB NEW

00x1200ppi (9600ppi maximum), 42bit flatbed scanner with USB
terface. Features one-touch buttons for scanning direct to e-mail, printer
r ScanWise. Includes 3 interchangable coloured handles. Software
ackage includes AgfA ScanWise, Readiris, Corel PrintOffice 2000 and
GFAnet Print Service. Compatible with Win98/2000/Me and MacOS.

## SnapScan e20 USB NEW

00x1200 optical resolution (9600 maximum), 36bit, USB
terface, Mac & Win98/Win2000Me compatible. Includes 3
terchangeable coloured handles, Software package includes
gfa ScanWise, Readiris and Corel PrintOffice 2000

(B1175) GST Inc: **$195**



(B6378) GST Inc: **$255**

## SnapScan e40 USB



1200x2400ppi (9600ppi maximum), 42bit flatbed scanner with USB interface.Software package includes Agfa ScanWise, ReadIris and Corel PrintOffice 2000. Compatible with Win98/2000/Me - MacOs

(A5009) GST Inc: **$314**

## SnapScan e50 USB



1200 x 2400ppi (9600 maximum), 42bit flatbed scanner with built in transperancy module for transperancy and negative scanning. Features one-touch buttons for scanning direct to email, OCR, printer or image manipulation software. USB interface. Software package includes: Agfa ScanWise, Readiris and Corel PrintOffice 2000.

(99759) GST Inc: **$385**

## ePhoto CL18 USB



Dual mode (still image and live action), compact, easy to use digital camera with USB interface and a resolution of 640x480 pixels. Stores 16-32 images on 2MB internal (non-removable) memory card. Extensive software package includes: Agfa Twain Driver, ArcSoft Video Impression, Corel PrintOffice and PrintHouse (with Agfa PhotoGenie QuickFix technology), MicroSoft Net Meeting, AGFAnet Print Service.

(99757) GST Inc: **$280**

## ePhoto CL20 USB



Dual mode (still image and live action) megapixel digital camera with USB interface. Resolution of 1280x960 pixels (with PhotoGenie). Stores 10-30 images on 1MB internal memory with a CompactFlash slot for optional storage on CompactFlash cards (card not included). Extensive software package includes: Agfa Twain Driver, AgfaCam Mounter, Agfa PhotoWise 3.0, ArcSoft Video Impression, MicroSoft Net Meeting, AGFAnet client software, Acrobat Reader.

(B1153) GST Inc: **$3340**

## ePhoto CL30Clik! USB



The fantastic ePhoto CL30 now available with built-in Iomega Clik! Drive. Mega-pixel digital camera with USB interface and a resolution of 1440x1080 pixels. Features an optical viewfinder and 1.8" colour LCD screen. Auto focus lens with 2x digital zoom and macro function.

(89409) GST Inc: **$1,070**



DuoScan T1200 SCSI-2. 36 bit. Transparency scanning. Opt. res. 600x1200ppi (74498) GST Inc: **$1,263**



DuoScan T2500 SCSI-2. 36 bit. Transparency scanning. True opt. res. 1250ppi (74499) GST Inc: **$8,319**



DuoScan HiD (92981) GST Inc: **$3,639**

Document Feeder DuoScan T1200 (75581) GST Inc: **$Call**

Batch Slide holder set for DuoScan T1200 (75582) GST Inc: **$197**



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## EPSON AL-C2000

TRY BEFORE YOU BUY

**Advanced EPSON Technology for Superb Colour Quality**

The Aculaser C2000 ensures that colours are accurate and consistent through the use of a number of exclusive EPSON technologies, including AcuLaser Multiple-screen Printing, Colour RIT (Resolution Improvement Technology) and Colour Stabilizing. In addition, AcuLaser Colour Halftoning provides print resolution equivalent to 2,400 dpi (defined print resolution: 600dpi). Halftoning also improves the quality of the all-important black output, so text is extremely sharp and photos have excellent contrast.



(A7365) GST INC **$4,430**

## colour printers>>>

Web Direct

See the Web Direct Link for more products and latest info!



### EPSON STYLUS COLOR 480

This printer brings the quality and performance of our PerfectPicture Imaging System within everyone's reach. It offers the fine-grained detail of Ultra Micro Dot Printing, and the speed and beauty of Variable-Sized Droplet Technology. With the new simple-to-use design, this printer makes perfect sense as your home inkjet printer.

(A0409) GST INC **$154**



### EPSON STYLUS COLOR 580

Ideal for home, school and home office use, this printert provides easy, plug-and-play support for Windows 98/2000 and USB equipped Macintosh systems, and comes with everything you need to print beautiful colour photo's, presentations, newsletters, reports…

(A8092) GST INC **$214**



### EPSON STYLUS COLOR 680

With industry leading 2880 dpi print resolution and super fine 4pl Micro Droplets, images produced from this printer indistinguishable from photographs. EPSON's exclusive Micro Piezo technology ensures high-speed throughput with crisp, sharp text, making this printer the perfect PC partner in any Home or Home Office .

(A8093) GST INC **$299**



### EPSON STYLUS COLOR 880

Here is an inkjet printer that offers everything today's business users demand – speed, super-sharp text, beautiful graphics & super smooth operation, thanks to EPSON's Micro Piezo technology. Offering high print speed & industry leading print quality, this printer is perfect for any office environment.

(B0581) GST INC **$559**

## scanners>>>

Ask about



- ☐ Extend to a total of 3 Years Return to Base
- ☐ Extend to a total of 5 Years Return to Base
- ☐ Upgrade Return to Base of Warranty Extension to On-Site

### NEW EPSON EXPRESSION 1640XL



The Expression 1640XL A3+ scanner features EPSON's most advanced scanning technologies providing high speed, maximum detail and superior sharpness and clarity.

(B1330) GST INC **$5,455**

### EPSON PERFECTION 640U



**Ideal for Home Use.** The ideal home scanner providing 600x2400 dpi image quality at the touch of a button. The EPSON SMART PANEL user friendly interface allows you to take advantage of its advanced scanning features with ease.

(B0537) GST INC **$257**

### EPSON PERFECTION 1240U



**Perfect for the Home & SOHO User.** This scanner provides 1200 x 2400dpi image quality with incredible operating ease. The EPSON SMART PANEL allows you to add high quality images to e-mail, documents & presentations, produce colour copies & photo reprints, convert scanned text to editable text & image editing tasks.

(B0546) GST INC **$422**

MAR 48

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FUJI XEROX

Web Direct www.ht.com.au/cat/fuji

# Unmatched Productivity and value

All Phaser colour network printers from Fuji Xerox offer the experience and strength from the integration of both Tektronix and Xerox, delivering you world class technology and the new standard for workgroup colour printing.

Our range of Phaser printers offer high speed, high quality, great value colour network printers for workgroups of one and up. With the choice of the widest colour network range available — whatever your requirements — you can be sure there's a Phaser Colour Printer that is designed and customisable to meet your needs today and in the future.

**Tektronix**

**COLOR PRINTERS BY**

**FUJI XEROX**

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## 750



### No compromise at an entry level price

**Phaser 750** delivers best in class capabilities for all-purpose workgroup performance, with true 1200dpi at full rated speed and a hard to beat price.

- Stunning photographic quality - true 1200 x 1200 dpi
- High class performance at 5ppm colour and 16ppm mono
- Network ready with 10/100 BaseT Ethernet out of the box

(A1401) GST Inc:

Four models available from **$4,859**

## 850



### Fast brilliant colour at the lowest of costs

With the **Phaser 850**'s low total cost of ownership, ease of use and powerhouse speeds and high print quality, everyday colour printing is made elementary.

- Vibrant Colour and 1200 dpi quality
- 1st class speed - the fastest first page out and 14ppm colour and mono
- Unbelievably affordable - FREE black ink for life, no catches.

(90162) GST Inc:

Three models available from **$5,719**

## 1235



### A new standard — print colour at mono speeds

The **Phaser 1235** is the next generation laser class printer that provides larger workgroups affordable, high speed colour you can depend on

- Unrivalled 12ppm colour and 20ppm mono at 1200dpi
- The latest options in media handling
- Unbelievable cost per page per minute

(B2971) GST Inc:

Three models available **$8,069**

## 790



### When critical detail is required...

For dynamic prints - when colour matching is critical and exceptional detail is required - you need the **Phaser 790** network colour laser printer.

- Optional 2 sided printing and full A3 bleed
- Media as varied as heavyweight, coated gloss and transparencies
- Superior colour tools will print the the minutest detail

(B2972) GST Inc:

Two models available **$13,859**

RENTSMART

TOUCH OF 200 Years Experience

SEE PAGE 64 FOR DETAILS

The figures quoted are based on a per week basis over 3 years. To approved persons, Terms and Conditions apply.



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# Simply the best...for any office

RENTSMART

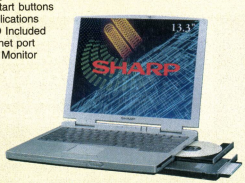
$200 VOUCHER Rental Reimbursement

SEE PAGE 64 FOR DETAILS

The figures quoted are based on a per week basis over 3 years. To approved persons, Terms and Conditions apply.

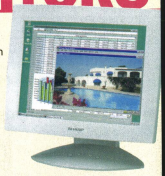
## PCAX20 NOTEBOOKS

- Intel Pentium III 600MHz L2 Cache 256K
- 64Mb (expandable to 192Mb) SDRAM
- 12Gb HDD
- 12.1"TFT (1024*768 Res)
- Built-in 56 Kbps Fax/Data Modem
- Five Quick Start buttons to launch applications
- External FDD Included
- 10/100 Ethernet port
- 2xUSB, VGA Monitor




(A7889) GST INC **$4,587**

## LLT155A MONITORS



- Screen size 15-inch (diagonal 38cm), resolution XGA (max 1024 x 768 dots)
- High- Resolution (200 cd/m², 300:1) TFT LCD for superb image quality, up to 16 million colours
- Auto balance (automatic colour level adjustment)
- Automatic pixel converter (VGA/SVGA)
- Long-lasting backlights- up to 50,000 hours
- Power management function- max 22W during operation, down to 5W during power safe mode
- Plug and play compatible- Win 95/98
- Uses one-fourth the space of a CRT monitor
- User- friendly design with reduced flicker is easier on the eyes.

(A2819) GST INC **$2,259**

More from SHARP

**FO-780 Plain Paper Fax** Thermal Transfer **(77811) GST INC $340**

**FO-880 Plain Paper Fax** Digital Answer Machine Compatible **(86520) GST INC $425**

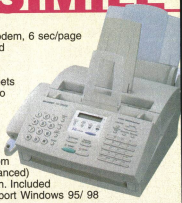
## AL-880 COPIERS



- High Quality 600dpi Digital Laser Multifunction (copy, print, fax, scan)
- 8cpm
- Built in Printer function: The digital copier is also an 8ppm true 600dpi x 600dpi laser printer with IEE1284 bi-directional interface port
- Built in G3 fax with SPF function
- Easy operation from Fax Operation Panel
- Built in Scanner function, twain compliant
- Scan Once Print Many (SOPM) function
- Space saving Stationery Platen
- 250 sheet Rear Loading Paper Tray
- Zoom function with Reduction/Enlargement from 50% to 200%
- Front loading supply cartridges make replacementeasy.

(92726) GST INC **$1,745**

## FO2950 FACSIMILE



- Fast 14.4 Kbps modem, 6 sec/page transmission speed
- 8 ppm quick scan
- 8 ppm print speed
- Capacity: 200 sheets and a 20 sheet auto document feeder.
- 100 speed dial locations and 20 one touch rapid dial keys.
- Laser printing 8 ppm and at 1,800 (enhanced) x 600 dpi resolution. Included printer drivers support Windows 95/ 98 / NT4.0
- 600 dpi (enhanced) B&W scanning in 256 gradations.
- Fax PC-generated documents directly from your computer.
- Send documents to any e-mail address. Scan document then send as a file attachment.
- Automatically forward incoming faxes to a designated e-mail address.

(A2549) GST INC **$1,290**

MAR 50

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## the prize catch

**On the back of a year that saw sales double, Hitachi CRT monitor sales have increased another 300%*. Why the massive growth? Is it the comprehensive range? Is it the leading technology or superior quality?**

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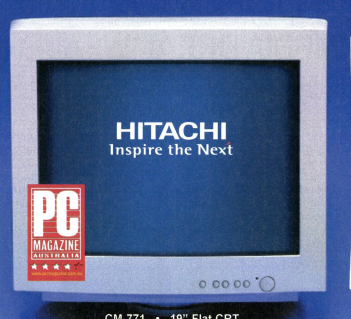


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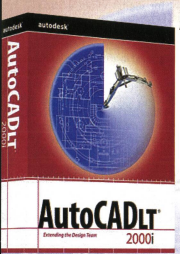
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# What today's CAD designers want




## AutoCAD LT 2000i

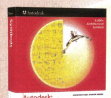
Now it's easier than ever to extend your AutoCAD® design team! Introducing AutoCAD LT 2000i. Productivity-packed and easy to learn, use, and remember, it's the only low-cost, professional 2D CAD program to combine 100% AutoCAD® 2000/2000i drawing compatibility with simple-to-use Internet tools. Use it to enhance drawing productivity and gain a critical competitive edge.

**Includes a Microsoft mouse. And a copy of Encyclopedia Britannica 99 (valued at $99) when you register the product. (only with purchase of Full Version)**



**FULL VERSION:** (A2432)
GST INC **$1,385**

**UPGRADE:** (A2793)
GST INC **$380**




## Symbols 2000 Architectural

This professional collection of the most commonly used symbols can significantly improve your productivity by giving you a ready-made library of design elements. With the toolbar-style interface, find any of the 5,600-plus symbols with only2 mouse clicks, then place where you need.

(A1319) GST INC
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## Symbols 2000 Engineering

Find any of the 10,800-plus symbols with only2 mouse clicks, then place where you need. Electrical IEC, Electrical JIC, Mechanical DIN/ISO Library, Hydraulics, Pneumatics, Materials Processing and Ventillation, Electronics, Organizational and Planning Libraries.

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## AutoCAD Architectural Desktop

*Student Version

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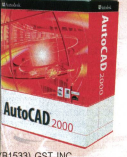
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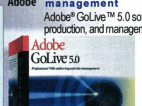

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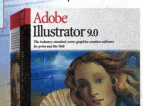
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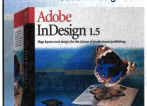
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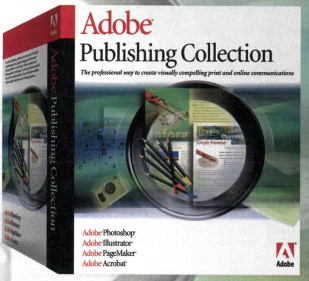
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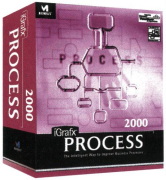
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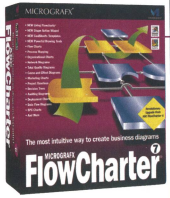
New version now includes full copy of iGrafx FlowCharter 2000 Professional and iGrafx OrgCharter. Also includes Auto-Layout feature, improved simulation algorithms and timetable generator. Process 2000 now allows for data to be imported into the process simulation from 'real world systems' with minimal customisation. Integrated process diagramming, simulation and analysis features make iGrafx Process 2000 the ultimate tool for process improvement. Allows 'What If?' scenarios and resource and cost analysis. Features Microsoft Office compatibility, HTML support, Visual BASIC for Applications v6 extensibility and more.

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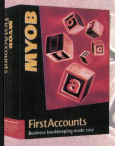
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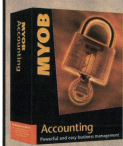
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## MYOB Accounting




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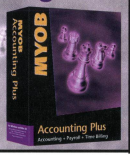
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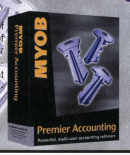
uited to both service and inventory based usinesses with 1-30 employees. MYOB Acounting Plus maintains MYOB Accounting's ase-of-use and extends the functionality to clude, fully integrated payroll, professional me billing module and OfficeLink. BAS & ST ready.




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# Manage your Desktop Efficiently

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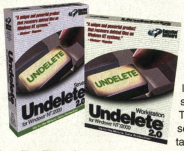



Diskeeper for Windows 2000/MT/95/98/Me Servers and Workstations solves the problem of degraded disk performance due to file fragmentation, by optimising the disk file structures. Fragmentation first strikes during the process of installing Windows and continues to spread degrading system performance whenever files are edited, compressed or uncompressed. The resulting delays in disk head seek times required to retrieve these files can reduce system performance significantly. The disk drive is the slowest component of any system but using Diskeeper, software loading, large graphic and video file handling and database search times can be significantly reduced.

**Diskeeper V6.0 Server** (B6000) GST Inc: **$560**

**Diskeeper V6.0 Workstation** (B6001) GST Inc: **$120**

## Undelete V2.0




Accidentally deleted files are a fact of computing life. When accidentally deleted files are not in the Recycle Bin, it makes lots of extra work for system administrators. The usual solution is to search through backup tapes until they find the lost file. This often consumes hours. Most businesses run backup at night, so work done after the latest backup is often lost and needs to be recreated. More wasted time and lost productivity. Undelete is a complete solution for Windows NT/2000 Servers and Workstations giving a Network Administrator the ability to instantly restore deleted files. As you will see, Executive Software Undelete provides a complete, real world solution to these every day problems.

**Undelete V2.0 Server** (B6002) GST Inc: **$560**

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## Symantec WinFax Pro



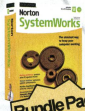
$105

(96427) GST INC

## Back to Business Bundle Pack

1 of 10 WIN PS2's*

This bundle from Symantec is available for a limited time only, combines **Norton SystemWorks 2001** – which consists of best-of-breed, award-winning solutions that are designed to work together, so you can easily improve system performance, eliminate viruses, and remove unwanted files, **AND Norton Personal Firewall 2001** - to give you peace of mind that your PC is secure from intrusion by hackers and your privacy is protected. *Also Includes* **Norton SystemWorks 2001 Retail Upgrade**; $40 rebate coupon in box for previous customers of **Norton SystemWorks, Norton AntiVirus, Norton Utilities, Norton CrashGuard, Norton CleanSweep** or **Norton Internet Security.**



Bundle Pack (B4387) GST INC $150

**NORTON SYSTEM WORKS 2001** SOLD SEPERATELY (A7648) GST INC **$129**

**NORTON PERSONAL FIREWALL 2001** SOLD SEPERATELY (A8102) GST INC **$80**

*For customers purchasing the Back to Business Bundle Pack. Promotion valid until March 31 2001

## Norton AntiVirus 7.5 Small Business Solutions for 10 users

NEW PRODUCT

For small managed networks consisting of 1 server and up to 9 work stations, **Norton AntiVirus 7.5** Small Business Solution for 10 Users, provides automated, centralised virus protection and management. Customers who purchase and register this product are eligible for 12 months Upgrade Insurance from Symantec. Additional server or workstation licences may be purchased through the **Symantec Value Licence Program**. *Platforms Supported:* Netware 3.13, 3.2, 4.11, 4.2, 5.X; WinNT v4/2000 Server; OS/2 client; DOS, Win3x; Win95/98; WinNT v4/2000 & Macintosh.



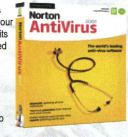
(B3129) GST INC **$990**

## Norton AntiVirus 2001v7.0

**Norton AntiVirus**™ is the world's leading anti-virus software. It's always working in the background to protect your PC, and now it automatically updates its virus definitions when you're connected to the Internet.

- Eliminates dangerous viruses,
- Defends against hackers
- Protects your privacy online.

What's New and Improved? AntiVirus protection that is always up to date — **LiveUpdate 1.6** makes download faster all over the world, Smart scanning engine. Bootable CD for emergencies.

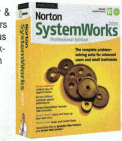


(A5736) GST INC **$80**

## Norton SystemWorks 2001 Professional Edition

This edition addresses the more sophisticated needs of the power user & small business owner. This suite offers all the tools in the standard edition, plus extra help with managing faxing & fax-on-demand needs, as well as system upgrading & backup tasks. Includes:

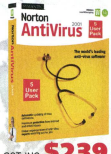
- **Norton AntiVirus 2001**
- **Norton Utilities 2001**
- **Norton CleanSweep 2001**
- **Norton Web Services 2001**
- **Norton Ghost 2001**
- **WinFax 10.0 Basic Edition**



(A7647) GST INC **$170**

## Norton AntiVirus 2001 (5 user pack)

**Norton AntiVirus**™ is the world's leading anti-virus software. Norton **AntiVirus 2001** Multi-user pack provides essential virus protection for the small business to licence up to five workstations. It's always working in the background to protect your PC, and now it automatically updates its virus definitions when you're connected to the Internet. Don't let your company fall victim to viruses or other malicious internet code.



(B2937) GST INC **$239**

## Norton Internet Security 2001 v2.5

This integrated security and privacy suite helps you defend your computer against hackers with **Norton Personal Firewall 2001.** You also get Symantec's award-winning **Norton AntiVirus 2001** software to stop viruses, malicious **ActiveX®** controls & Java programs, & other dangerous code. In addition, **Norton Privacy Control** lets you keep personal information from being sent to web sites without your permission, control Internet *"cookies,"* & block banner ads to accelerate download speeds.



(A8104) GST INC **$105**

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The Matrox pioneered DualHead display, introduced and made popular by the award winning Matrox G400 series, making the millennium G450 the most versatile and feature-rich graphics card on the market today. DualHead offers a host of display features and software utilities that will change the way you work and play on your PC.






**Millennium G450**
(B6886) GST Inc: **$395**

**Incredibly Sharp and realistic image quality**
- UltraSharp, Lightning-fast 360MHz RAMDAC
- Vibrant Color Quality (VCQ2)
- Environment Mapped Bump Mapping which adds a new level of visual realism to many game environments
- More advanced 3D features e.g. Stencil buffering, trilinear filtering, alpha blending etc.

**Powerful 2D and 3D acceleration**
- Matrox G450 256-bit DualBus
- 3D Rendering array Processor
- Advanced AGP support
- There are over 35 games that support DualHead and/or Environment-Mapped Bump Mapping (EMBM), including: Star Trek, Armada, Baseball 2000, Destroyer Command, Battlezone II, Combat Commander, The Rift to name a few.

**DualHead Display** offers a host of options designed to meet your particular needs.
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- DualHead TV Output
- DualHead Clone



**G45+MDHA16LED**
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**G45+MDHA16DB**
OEM (B3110) GST Inc: **$290**

**G45+MDHA32DB**
OEM(B3111) GST Inc: **$390**

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SEE PAGE 64 FOR MORE DETAILS

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Desktop Marketing Systems Pty Ltd

Web Direct www.ht.com.au/cat/dtms

## Need to find a telephone number?

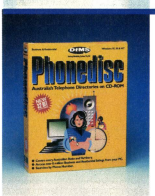



### CD Phone Directory
***8.5 million listings, business and residential Australia wide***

(B1182) GST Inc: **$21**

*Search by:*
- *company name*
- *surname*
- *suburb*
- *line of business*
- *state*
- *postcode*

**Reference only - no printing*




### Phonedisc
***Step up from CD Phone Directory.***
***More powerful searching.***

(B1199) GST Inc: **$130**

*Search by:*
- *telephone/fax number*
- *postcode*
- *company name*
- *radius from a postcode*
- *suburb*
- *surname*
- *state*
- *line of business*

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|---|---|---|---|
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| Web Reporting | ✔ | ✔ | |
| Report Creation & Design | ✔ | ✔ | ✔ |

* *Available in English only.*



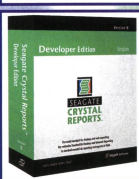

## Crystal Reports Professional

**Crystal Reports Pro 8**
(95574) GST Inc: **$745**

**Crystal Reports Pro 8 Upg**
(95603) GST Inc: **$390**

**Crystal Reports Pro 8 5 User**
(95575) GST Inc: **$2,885**

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(95605) GST Inc: **$1,520**




## Crystal Reports Developer

**Crystal Reports Dev 8**
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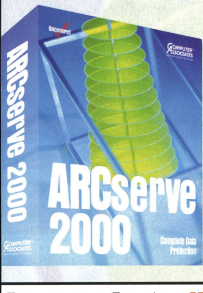
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Complete Data Protection for the Internet Age

Industry's most advanced storage solution delivers comprehensive data protection for Windows NT/2000 environments. ARCserve 2000 delivers centralised management, assured virus-free backup/restore, SAN serverless backup and integrated fail-over with Microsoft Cluster Services. Learn more about how this industry-leading solution can help you address the eBusiness challenges of availability, scalability, and high performance.




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(A2228) GST Inc: **$915**

**ARCserve for Windows NT/2000 - Advanced Edition**
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(A2229) GST Inc: **$1,839**

**ARCserve for Windows NT/2000 - Advanced Edition - Disaster Recovery Option**
(A2234) GST Inc: **$915**

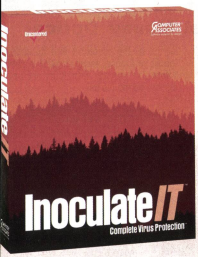
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**ARCserve 7 for Netware Single Server**
(B6727)
GST INC
**$997**

## InoculateIT 4.53 Windows NT/2000

InoculateIT is the premier antivirus solution for networked environments offering unmatched management and virus protection.




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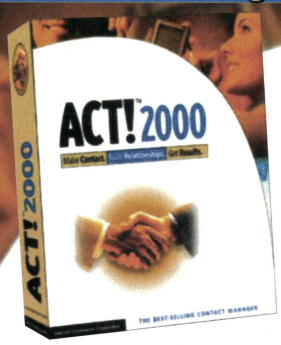
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### Intellimouse Optical




Is the second generation of Microsoft mice to use the breakthrough IntelliEye optical sensor technology. The optical sensor provides smooth and precise movement. Optical also is equipped with a wheel for efficient scrolling and has additional buttons to enhance forward and back navigation on the Internet.

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### Intellimouse Explorer




Featuring the most significant improvements to the mouse since it was invented 30 years ago. Intellimouse Explorer is the first mouse to give you superior precision.

(84211) GST INC: **$75**

### Wheel Mouse Optical




Brings all the precision and durability IntelliEye Optical technology to a simpl affordable mouse. Revolutionary optic sensor- no mouse ball.

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### Natural Keyboard Pro

- 19 hot keys allow you to browse the web, check e-mail or play a CD directly from your keyboard.
- Two USB ports allow you to plug USB devices directly into your keyboard.
- Comfortable, natural design.




(87385) GST INC: **$89**

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- Two USB ports allow you to plu USB devices directly into yo keyboard.




(A1783) GST INC: **$67**

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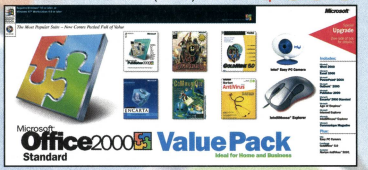
## The Office 2000 Family

### Microsoft Office Value Pack

(B1737) GST INC: **$590**

Office 2000 Standard Upgrade Edition
Publisher 2000 Full Version
Age of Empires I
Encarta 2000 Standard Edition
Intellimouse Explorer
Communique 6 month subscription
Symantec Norton Antivirus 2001
GoldMine 5.0
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* Based on RRP of individual items.




Microsoft Office 2000 ValuePack
CONTAINS OVER $1,700* WORTH OF PRODUCTS!

## Microsoft Office 2000

Microsoft Office 2000 offers a multitude of new features which extend desktop productivity to the Web, streamlining work processes and simplifying how individuals and organisations share, access, and analyse business information.



| APPLICATIONS | Standard | Small Business | Professional | Premium SR-1 (incl. PhotoDraw 2000.2) | Developer |
|---|---|---|---|---|---|
| Word 2000 | ✓ | ✓ | ✓ | ✓ | ✓ |
| Excel 2000 | ✓ | ✓ | ✓ | ✓ | ✓ |
| Outlook 2000 | ✓ | ✓ | ✓ | ✓ | ✓ |
| Powerpoint 2000 | ✓ | | ✓ | ✓ | ✓ |
| Publisher 2000 | | ✓ | ✓ | ✓ | ✓ |
| Small Business Tools | | ✓ | ✓ | ✓ | ✓ |
| Access 2000 | | | ✓ | ✓ | ✓ |
| FrontPage 2000 | | | | ✓ | ✓ |
| PhotoDraw 2000 | | | | ✓ | ✓ |
| Dev. Tools & Database Runtimes | | | | | ✓ |
| Part number **FULL VERSION** | (75956) GST INC: **$890** | (75960) GST INC: **$897** | (75958) GST INC: **$1,079** | (99648) GST INC: **$1,435** | (75957) GST INC: **$1,560** |
| Part number **UPGRADE** | (76477) GST INC: **$480** | (76481) GST INC: **$488** | (76479) GST INC: **$615** | (99649) GST INC: **$740** | (B5497) GST INC: **$1,165** |

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**FrontPage 2000** - Designed for creation and editing of Internet and Intranet Sites
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Microsoft Visio 2000 Technical Edition
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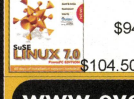
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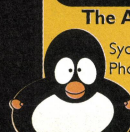
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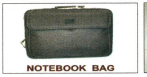
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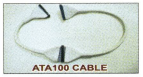

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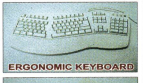

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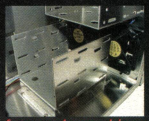
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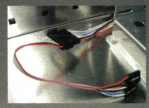


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| HP Desk Jet 710/720/890/900 Series | 3x3 | 30B-CLR |
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| EPSON Stylus 820/colour II/Is | 3x12 | 24-CLR |
| EPSON Stylus Colour 200/300/400/500/600/800/850/1520 | 3x12 | 34A-CLR |
| EPSON Stylus Colour 440/460/480/640/660/700/740/760/900 | 3x12 | 34B-CLR |
| IBM/LEXMARK 4076/1000/1020/2000/2030/2050 Series | 3x6 | 36A-CLR |
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| Asus CUV-4X (VIA, S370,AGP Pro 4x, 133) | $230 |

## FDD & STORAGE DEVICES

| | |
|---|---|
| 1.44MB 3.5" Floppy Disk Drive | $28 |
| LS120 SuperDisk 2x Int. IDE (oem) | $160 |
| Iomega 150M Zip Int. IDE (oem) | $117 |
| Iomega 100M Zip Ext. USB | $224 |
| Iomega 250M Zip Int. IDE (oem) | $199 |
| Iomega 250M Zip Ext. USB | $259 |
| ORB 2.2GB Int. IDE Drive (oem) | $297 |
| ORB 2.2GB Ext. USB Drive (retail) | $422 |
| ORB 5.7GB Int. IDE Drive | $790 |
| ORB 5.7GB Ext. Firewire Drive | $820 |

## VIDEO & GAMES CARDS

| | |
|---|---|
| 4M Eagle 128 Vivo 32X AGP-VGA Card | $50 |
| 8M Eagle 53 Tnt 32X AGP-VGA Card | $90 |
| 16M Eagle TNT2 Vanta AGP | $110 |
| 32M Eagle TNT2 Vanta AGP | $115 |
| 32M TNT2 M64 AGP w/ TV Out | $133 |
| 32M TNT2 M64 PCI | $153 |
| 32M Eagle GF MX Pro 4 | $199 |
| 32M Asus V7100 GeForce II MX TV Out | $215 |
| 32M Asus V7100 GeForce II MX DVD | $301 |
| 32M Asus V7700 GeForce II GTS DDR Pro | $515 |
| 32M Asus V7700 GeForce II GTS Deluxe | $539 |
| 64M Asus V7700 GeForce II GTS DDR Pro | $839 |
| 32M Asus V7700 GeForce II GTS DDR Ultra | $1,041 |
| 32M ATI Rage Fury Pro AGP VIVO | $205 |
| 32M ATI Rage Fury MAXX AGP | $325 |
| 32M ATI All-in-Wonder 128 Pro AGP | $496 |
| 32M ATI Radeon DDR AGP (oem) | $253 |
| Leadtek WinFast A250 LE Deskt | $1,269 |
| Leadtek WinFast A250 Deskt | $1,786 |
| Leadtek WinFast A250 Ultra Deskt | $2,078 |
| NEC 15" LCD 1525V Monitor 0024 x 768 | $677 |
| Sony 15" SDM-P051 TFT Monitor | $2,308 |
| Sony 18" CPD-L181 TFT Monitor | $6,032 |
| Viewsonic 15" LCD VE150 1024x768 | $1,804 |

## CASINGS

| | |
|---|---|
| Deluxe Mid Tower ATX 250W | $61 |
| AOpen Mid Tower ATX 4744B | $83 |
| AOpen Full Tower ATX 9103 | $180 |
| Intel Chassis Chassis for Pentium 4 | $193 |
| Micase Mid Tower ATX KA-80 250W | $101 |
| Micase Mid Tower ATX KA-580WP 250W | $130 |
| Micase Full Tower ATX KA-C-80 300W | $197 |
| 750 SuperO 300W Slot1/2 Server CASE | $491 |
| 801 SuperO Deluxe Dual PIII/Xeon Chassis | $987 |
| 802 SuperO Deluxe Dual PIII/Xeon Chassis | $1,456 |
| 5.25" External Case for IDE - USB | $185 |
| 5.25" External Case for SCSI-68 | $158 |
| 250W ATX Power Supply | $40 |
| 300W ATX Power Supply | $80 |

## KEYBOARDS & MICE

| | |
|---|---|
| Acer Accufel Keyboard PS2 | $24 |
| Honeywell Spacesaver II Din-5/8*52 | $44 |
| Fujitsu Internet Keyboard PS2 | $75 |
| KeyTronic Designer Keyboard PS/2 (Black) | $45 |
| Logitech Internet Keyboard PS/2 (oem) | $52 |
| Logitech Class Keyboard + Mouse (oem) | $31 |
| Logitech Class Freedom Pro (Kb + Mouse)(oem) | $220 |
| Logitech Cordless Desktop Theater | $800 |
| Logitech SoundMan Xtrusio DSR-100 | $352 |
| Tamita YSTMS55 Sub + Speakers USB | $136 |
| Tamita YSTMS55 Sub + Speakers USB | $255 |

## PRINTERS

| | |
|---|---|
| Acer Forayma 300P | $314 |
| Brother HL-1240 12ppm 2M Laser | $518 |
| Samsung ML-4500 8ppm 600dpi | $431 |
| Canon BJC-1000SP | $107 |
| Canon BJC-2100SP 5ppm | $249 |
| Canon BJC-3000 (H268) | $279 |
| Canon BJC-6200 8ppm (1440x720) | $350 |
| Canon BJC-8200 | $451 |
| Epson Stylus Color 480 (720x720) | $160 |
| Epson Stylus Color 580 (1440x720) (USB) | $304 |
| Epson Stylus Color 680 (2880x720) (+USB) | $303 |
| Epson Stylus Color 777 (2880x720) (+USB) | $370 |
| Epson Stylus Photo 1270 (A3+) | $838 |
| Lexmark Z31 Color Jetprint (1200x1200) | $132 |
| Lexmark Z31 Color (1200x1200) | $162 |
| Lexmark Z32 Color (1200x1200) | $186 |
| Lexmark Z42 Color (1200x1200) | $223 |
| Lexmark Z52 Color (1200x1200) | $408 |
| HP Deskjet 640C | $178 |
| HP Deskjet 840C | $271 |
| HP Deskjet 930C | $322 |
| HP Deskjet 950C | $439 |
| HP Deskjet 990Cxi | $792 |
| HP Deskjet 1120C (A3) | $863 |
| HP Deskjet 1220C (A3) | $860 |

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- **Local Area Network - Wide Area Network- Virtual Private Network (VPN) - Remote Access & Data Management, Citrix Meta Frame 1.8A, Windows 2000 Server**

| | |
|---|---|
| Asus CUR-DLS (Dual S370, U-160, 10/100) | $1,371 |
| Asus A7V (VIA, U-100) | $317 |
| Intel BOXD850GR Garbinbi for Pentium 4 | $578 |
| Gigabyte 5AX (ALI, Soc-7, ATX, U-66) | $145 |
| Gigabyte GA-6VTXE (VGA, Audio, U-100) | $268 |
| Gigabyte GA-6VXDC7 (VIA, Dual S370) | $268 |
| Gigabyte 6VXE7+ (VIA, S370, U-66) | $182 |
| Gigabyte 6VXC7-6X (VIA, S370, AGP 4x) | $182 |
| Gigabyte GA-6VAXV+ (VIA, S370, AGP 4x) | $194 |
| Gigabyte GA-6VX7-133V (VIA, S370, IEEE-1394) | $264 |
| Gigabyte GA-7ZX (VIA, Soc-A, ATX) | $263 |
| Gigabyte GA-7ZXR (VIA, M-ATX, Audio) | $249 |
| MSI 694D Pro (Dual S370, Audio, U-100) | $370 |
| Supermicro 370DLE Board Server/Works | $697 |

## MEMORY

| | |
|---|---|
| 64MB PC133 SDRAM 168pin (oem) | $62 |
| 128MB PC133 SDRAM 168pin (oem) | $113 |
| 256MB PC133 SDRAM 168pin (oem) | $241 |
| 128MB SDRAM PC100 168pin (oem) | $160 |
| 256MB PC133 SDRAM ECC 168pin | $581 |
| 64MB Rambus RDRAM RIMM 800Mhz ECC | $383 |
| 128MB Rambus RDRAM RIMM 800Mhz ECC | $733 |

**Call for the most updated pricing ! Memory for Brand Name Notebook & Desktop, call 1300 368 932**

## HARD DISKS - IDE

| | |
|---|---|
| 15Gb Seagate Barracuda 7M 7200 | $231 |
| 30Gb Seagate Barracuda 7M 7200 | $319 |
| 30Gb 7200rpm IBM Deskstar U-100 2M 7200 | $252 |
| 45Gb 7200rpm IBM Deskstar U-100 2M 7200 | $392 |
| 20Gb Quantum Fireball AS U-100 2M 7200 | $255 |
| 30Gb Quantum Fireball AS U-100 2M 7200 | $326 |
| 20Gb WD Caviar 2MB U-100 5400 | $246 |
| 30 Gb WD Caviar U-100 5400 | $257 |
| 45 Gb WD Caviar U-100 5400 | $368 |

## HARD DISKS - NOTEBOOK

| | |
|---|---|
| 10GB Hitachi 9 5mm | $323 |
| 12GB Hitachi 9 5mm | $356 |

## HARD DISKS - SCSI

| | |
|---|---|
| 9Gb Quantum Atlas V-160 LVD68 | $396 |
| 18Gb Quantum Atlas V-160 LVD68 | $641 |
| 36Gb Quantum Atlas V-160 LVD68 | $1,085 |
| 9Gb Quantum Atlas 10K II U-160 LVD68 | $497 |
| 18Gb Quantum Atlas 10K II U-160 LVD68 | $767 |
| 36Gb Quantum Atlas 10K II U-160 LVD68 | $1,067 |
| 9.2Gb Seagate Barracuda LVD68 | $455 |
| 18.4Gb Seagate Barracuda U-160 LVD68 | $767 |
| 36.4Gb Seagate Barracuda U-160 LVD68 | $1,697 |
| 9.2Gb Seagate Cheetah U-160 10,000rpm | $599 |
| 18.4Gb Seagate Cheetah LVD68 10,000rpm | $737 |
| 36.7Gb Seagate Cheetah LVD68 10,000rpm | $1,264 |
| 18Gb Seagate Cheetah LVD68 15,000rpm | $1,179 |
| 9Gb IBM Ultrastar 36LZX U-160 10k LVD68 | $667 |
| 18Gb IBM Ultrastar 36LZX U-160 10k LVD68 | $1,011 |
| 36Gb IBM Ultrastar 36LZX U-160 10k LVD68 | $1,734 |

## CD-ROM & DVD ROM

| | |
|---|---|
| 44x IDE ATAPI CD-ROM Drive | $67 |
| 52x Creative CD-ROM Drive | $79 |
| 32x Teac SCSI CD-ROM Drive | $161 |
| Pioneer 16x DVD-ROM IDE Bare Drive (oem) | $214 |

## CD-WRITERS

| | |
|---|---|
| Plextor (12x/4x/32) SCSI + Soft + Media | $811 |
| Plextor (12x/4x/32) SCSI + Soft + Media | $888 |
| HP 9300i (10x4x32) IDE | $463 |
| HP 9600e (12x8x32) SCSI | $710 |
| HP 9600e (12x8x32) SCSI | $763 |
| HP 8230e (4x4x4x) Ext USB | $534 |
| HP 9600e (12x8x32) Ext SCSI | $890 |
| Acer (8x4x32) IDE + Soft + Media | $299 |
| Yamaha PT3260 (12x4x32) IDE + Soft + Media | $443 |
| Ricoh 9130A (12x10x32x8) IDE DVD-CDRW | $651 |
| Sony 140E (10x4x32) IDE Bare Drive (oem) | $214 |
| Sony 145S (10x4x32) SCSI Bare Drive (oem) | $420 |
| Sony 160E (12x4x32) IDE Bare Drive (oem) | $307 |
| Sony 200e (12x4x32) Int IDE | $427 |
| Iomega Zip 4x4x6x) Ext USB | $287 |
| Yamaha (8x4x32) IDE + Soft + Media | $479 |
| Yamaha (8x4x24) SCSI + Soft + Media | $479 |
| Yamaha (8x8x24) Ext SCSI + Soft + Media | $721 |
| Yamaha (8x4x24) Ext Firewire + Soft + Media | $721 |

## SOUND CARDS

| | |
|---|---|
| Sound Blaster PCI 64 (oem) | $45 |
| Sound Blaster PCI-128 2-Channel (oem) | $53 |
| Sound Blaster LIVE (oem) | $113 |
| Sound Blaster LIVE Platinum | $149 |
| Sound Blaster LIVE Platinum 5.1 | $449 |
| Creative Inspire 5.1 Digital 5700 (oem) | $110 |
| Guillemot Maxi Studio ISS XL | $700 |

## SPEAKERS

| | |
|---|---|
| Altec Lansing AC522 - 2p | $69 |
| Altec Lansing AC533 - 2p Subwoofer | $79 |
| Altec Lansing AC545.1 Power Cube - 3p | $165 |
| Altec Lansing MP3 Playmat - 3p | $169 |
| Altec Lansing AC556 Gamers -5p Digital in | $290 |
| Altec Lansing AC565 Dolby Digital PS, 5pcs | $325 |
| Altec Lansing ADA880 Dolby AC3 - 5p | $329 |
| Cambridge PCWorks 3-p | $50 |
| Cambridge SoundWorks 5.1 Surround | $131 |
| Cambridge MMS 5.1 Surround | $153 |
| Cambridge DTT2500D 6p Desktop Theater | $800 |
| Cambridge DTT3500D 6-p Desktop Theater | $800 |
| Logitech SoundMan Xtrusio DSR-100 | $352 |
| Tamita YSTMS55 Sub + Speakers USB | $136 |
| Tamita YSTMS55 Sub + Speakers USB | $255 |

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| Acer Forayma 300P | $314 |
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| Canon BJC-2100SP 5ppm | $249 |
| Canon BJC-3000 (H268) | $279 |
| Canon BJC-6200 8ppm (1440x720) | $350 |
| Canon BJC-8200 | $451 |
| Epson Stylus Color 480 (720x720) | $160 |
| Epson Stylus Color 580 (1440x720) (USB) | $304 |
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| Lexmark Z42 Color (1200x1200) | $223 |
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| HP Deskjet 930C | $322 |
| HP Deskjet 950C | $439 |
| HP Deskjet 990Cxi | $792 |
| HP Deskjet 1120C (A3) | $863 |
| HP Deskjet 1220C (A3) | $860 |

| | |
|---|---|
| Kodak DC-4800 | $1,318 |
| Sony Mavica MVC7DX5 Digital Camera | $1,398 |
| Sony Mavica MVC7DX6 Digital Camera | $1,580 |
| Sony Mavica MVC7DX5 Digital Camera | $2,119 |
| Sony Mavica MVC2CD1000 Digital Camera | $3,350 |
| Sony Cybershot DSC530 Digital Camera | $1,088 |
| Sony Cybershot DSC570 Digital Camera | $1,749 |
| Diamond Rio 500 64MB | $428 |
| Nomad II MG 64MB + Docking Station | $705 |
| Creative Labs MP3 Jukebox | $927 |
| Hp Zip MP3 Player | $582 |

## TV TUNERS

| | |
|---|---|
| Hauppauge WinTV PCI + FM Radio | $120 |
| Hauppauge WinTV USB | $161 |
| Miro Media PCTV PRO | $314 |
| Miro Media PCTV USB | $333 |

## VIDEO CONFERENCE CAMERA

| | |
|---|---|
| Creative VB WebCam Go Plus | $101 |
| Kodak DVC-325 Digital Video Camera USB | $157 |
| Logitech QuickCam Express USB (oem) | $90 |
| Logitech QuickCam Pro USB | $223 |
| Logitech QuickCam Pro 3000 | $235 |

## VIDEO CAPTURE CARDS

| | |
|---|---|
| Pinnacle Miro Studio DC10 + | $559 |
| Pinnacle Miro Studio DV | $306 |
| Pinnacle Miro Studio DV Plus | $534 |
| Pinnacle Miro Studio 30 | $687 |
| Pinnacle Miro Video DC30 + | $1,537 |
| Pinnacle Miro Video DV500 PRO | $1,701 |
| Pinnacle Miro Video DV200 | $1,402 |

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| | |
|---|---|
| 32M Matrox RT2000 Rtt | $2,626 |
| Canopus EZDV | $564 |

## CONTROLLER CARD

| | |
|---|---|
| Promise U-100 + Cable (oem) | $95 |
| Promise Fasttrak-100 IDE RAID Array 0/1 | $218 |
| Adaptec 2904 PCI | $155 |
| Adaptec 2930 U PCI Rx | $345 |
| Adaptec 19160 PCI U-160 2xInt 32-Bit Rx | $551 |
| Adaptec 29160 U-160 64-bit PCI Rx | $680 |
| Adaptec 29160 U-160 RAID 1-Channel (Kit) | $976 |

## HOT BACKUP

| | |
|---|---|
| Onstream 30GB Internal IDE Drive | $527 |
| Seagate 20GB TR3 IDE Kit + Backup Exec | $590 |
| Seagate 40GB TR4 IDE Kit + Backup Exec | $1,495 |
| HP LyraDAT 12-24GB Int. + OmniBack | $2,275 |
| HP LyraDAT 36-40GB Int. + OmniBack | $2,785 |

## NETWORK ADAPTORS

| | |
|---|---|
| Skymaster 10/100M PCI (OEM) | $36 |
| D-Link DFE-530TX+ 10/100M PCI Ethernet | $90 |
| 3Com 3C905 10/100M PCI Ethernet (OEM) | $87 |
| Compex 10/100M PCI Ethernet | $35 |
| Intel 82550 10/100M PCI Ethernet (oem) | $96 |
| NetGear FA311TX 10/100M PCI (oem) | $797 |
| Kingmax PCMCIA 10/100 Ethernet | $125 |

## HUBS

| | |
|---|---|
| Swann Smart 4-Port Powered Hub | $71 |
| Accton 8p 10M Hub (oem) | $64 |
| Accton 16p 10/100 Switching Hub | $238 |
| D-Link 8-Port 10/100 Hub (DES-908DX) | $321 |
| Linksys Print Server 3-Port 10/100M (EP-3XU) | $169 |
| Intel Infusiones 8-p 10/100M Hub Auto | $293 |
| Intel Infusiones 16-p 10/100M Hub Auto | $460 |
| Intel Infusiones 16-p 10/100M Switch | $960 |
| Intel Express 140T 16-p 10/100M Stand Hub | $1,003 |
| Intel Express 140T 24-p 10/100M Stand Hub | $1,322 |
| Intel Infusiones 4-p 10/100M Switch | $273 |
| Intel Infusiones 100T 16-p 10/100M Switch | $1,318 |
| Intel Express 410T 24-p 10/100M Switch | $1,767 |
| Intel NetPort Express 3-p 10/100M Print Server | $172 |
| Netgear 4-p 10/100M Hub + 2xFA310 + CA | $259 |
| Netgear 5-p 10/100 Switch + 2xFA310 + CA | $269 |
| Netgear 8-p 10/100 Hub + 2xFA310 + CA | $345 |
| Netgear 16-p 10/100 Dual Speed Hub + CA | $434 |
| Netgear 16-p 10/100 Dual Speed Hub Int. | $1,302 |
| Netgear 16-p 10/100 Dual Speed Hub Int. | $660 |
| Netgear PS112 3-p 10/100 Print Server | $322 |
| Netgear 56K Analogue Modem Router | $440 |
| Netgear Router for DSL & Cable Modems | $1,257 |
| Netgear Router 4-p Switch + 4-p Switch | $1,412 |
| POWER PROTECTION (UPS) | |
| SOLA 300VA/180W | $180 |
| APC Backup 300 Multipoint | $151 |
| APC Backup 500 | $252 |
| APC Smart-UPS 420 & Powerchute+ | $381 |
| Liebert Powersure ProActive 350VA UPS | $382 |

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- Genuine AMD Duron or Thunderbird Processor
- Asus A7V (VIA, Soc-A, U-100) M/Board
- 128Mb SDRAM PC 133
- 45Gb 7200rpm Ultra-100 IDE HDD
- 1.44Mb 3.5" Floppy Disk Drive
- 32M Leadtek GeForce II MX V'Card
- AOpen KF45B 250W ATX Midi Tower Case
- Microsoft Internet PS/2 Keyboard
- Microsoft Intellimouse PS/2
- 16x DVD 40x CD-Rom Drive
- Creative Sound Blaster Live! Soundcard
- Altec Lansing ACS233 Stereo Speakers
- 56K V90 Internal Fax/Data Modem
- Windows 98 / Millennium installed & conf.

| Price | |
|---|---|
| D-800 | $2,120 |
| D-850 | $2,180 |
| K7-900T | $2,250 |
| K7-1100 | $2,450 |
| K7-1200 | $2,520 |

**Thunderbird K7-1000T $2,350**

## forté Thorium III Server*

- 2x Intel Pentium III B66 Processor
- Gigabyte GA-6XKDC7 Dual CPU Motherboard
- 256Mb SDRAM PC 133
- 18Gb U-160 SCSI LVD68 7200rpm HDD
- 1.44Mb 3.5" Floppy Disk Drive
- 4Mb S3 Trio 32-3D/2X AGP Video Card
- AOpen HQ08 300W Full Tower Case
- Acer 104-Key PS/2 Keyboard
- Microsoft Trekker PS/2 Mouse
- 44x IDE CD-ROM Drive
- 3Com 3C905 10/100 PCI Ethernet
- Tekram 390U2W SCSI PCI Card



Illustration with optional 17"T monitor

**Dual PIII-866 $2,999**

## forté Millenium III Series

- Genuine Intel Pentium III B66 Processor
- ASUS CUSL2-C i815 Chipset U-100 Motherboard
- 128Mb SDRAM PC 133
- 30Gb 7200rpm Ultra-100 IDE HDD
- 1.44Mb 3.5" Floppy Drive
- 32Mb Leadtek Winfast GeForce II MX Video Card
- Hitachi CM 615 17" .24 Monitor
- Deluxe Midi Tower Case
- Logitech Internet PS/2 Keyboard
- Logitech Wheel Mouse PS/2
- Pioneer 16X DVD, 40X CD-Rom Drive
- Creative Sound Blaster Live Soundcard
- Altec Lansing ACS-233 Speakers
- 56K V90 Internal Voice/Fax/Data Modem
- Canon BJC-2100SP Printer
- Canon N640P Scanner
- Logitech Quickcam Express USB
- Windows 98 / Millennium installed & conf.

**Intel PIII-866 $2,999**

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**CM 615 Value $380†**
**CM 625 Flat Scr $640†**

**CM 715 $740†**
**CM 771 Flat Scr $850†**
**CM 772 Flat Scr $1,050†**

**CM 811 Value $1,600†**
**CM 813 $1,800†**

**Hitachi 15" TFT $1,690†**
**Hitachi 17" TFT $2,900†**

*1 Special monitor pricing valid for system purchases only.*

## forté Palladium III Series*

- Genuine Intel Processor
- ASUS CUSL-M Motherboard
- 64Mb SDRAM PC 133
- 10Gb Ultra-100 IDE HDD
- 1.44Mb 3.5" Floppy Drive
- 16Mb Shared On-Board Video
- 250W ATX Midi Tower Case
- 104-Key Windows PS/2 Keyboard
- 2-Button PS/2 Mouse
- 44x IDE CD-ROM Drive
- 16-Bit 3D On-Board Sound
- 180W PMPO Stereo Speakers
- 56K V90 Integrated Modem

| PRICES | | |
|---|---|---|
| Cel-667 | | $890 |
| Cel-700 | | $910 |
| Cel-733 | | $920 |
| Cel-766 | | $990 |
| PIII-866 | | $1,170 |

## forté Iridium III Series*

- Genuine Intel Processor
- Gigabyte GA-6VXE7+ VIA Chipset M'board
- 64Mb SDRAM PC 133
- 20Gb Ultra-100 IDE HDD
- 1.44Mb 3.5" Floppy Drive
- 8Mb S3 Trio 32-3D/2X AGP Video Card
- 250W ATX Midi Tower Case
- 104-Key Windows PS/2 Keyboard
- 2-Button PS/2 Mouse
- 44x IDE CD-ROM Drive
- Creative Sound Blaster Vibra 128 Soundcard
- 180W PMPO Stereo Speakers
- 56K V90 Internal Fax/Data Modem
- Windows 98 / Millenium installed & conf.

| PRICES | | |
|---|---|---|
| Cel-667 | | $1,180 |
| Cel-733 | | $1,210 |
| PIII-866 | | $1,460 |
| PIII-933 | | $1,570 |
| PIII-1000 | | $1,650 |

## forté Titanium III Series*

- Genuine AMD Duron or Athlon Processor
- Gigabyte GA-72M Motherboard
- 128Mb SDRAM PC 133
- 30Gb Ultra-100 7200rpm IDE HDD
- 1.44Mb 3.5" Floppy Drive
- 32Mb TNT2 Ranta AGP Video Card
- AOpen KF45B 250W ATX Midi Tower Case
- Logitech Internet Keyboard PS/2
- Microsoft Intellimouse PS/2
- 44x IDE CD-ROM Drive
- Creative Sound Blaster Vibra 128 Soundcard
- Jadiac Sub Woofer Premium Speakers
- 56K V90 Internal Fax/Data Modem
- Windows 98 / Millenium installed & conf.

| PRICES | | |
|---|---|---|
| Duron-800 | | $1,530 |
| Duron-850 | | $1,590 |
| A-900 | | $1,670 |
| A-1000 | | $1,760 |
| A-1100 | | $1,850 |

## forté Platinum III Series*

- Genuine Intel Processor
- Asus CUSL2-C i815 Chipset U-100 Motherboard
- 128Mb SDRAM PC 133
- 45Gb 7200rpm U-100 IDE Hard Drive
- 1.44Mb 3.5" Floppy Drive
- 32Mb Leadtek Winfast GeForce II MX Video Card
- 250W ATX Midi Tower Case
- Logitech Internet PS/2 Keyboard
- Microsoft Intellimouse PS/2
- 16X DVD, 40X CD-Rom Drive
- Creative Sound Blaster Live! Soundcard
- Altec Lansing ACS233 -3p Stereo Speakers
- 56K V90 Internal Fax/Data Modem
- Windows 98 / Millenium installed & conf.

| PRICES | | |
|---|---|---|
| Cel-667 | | $2,040 |
| Cel-733 | | $2,070 |
| PIII-833 | | $2,310 |
| PIII-933 | | $2,420 |
| PIII-1000 | | $2,490 |

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- Win98SE + LotusSmartsuiteMil

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PentiumIII Celeron 700 - $1399
PentiumIII Celeron 733 - $1498
PentiumIII Celeron 766 - $1565

### Peripherals

CD-RW

| | |
|---|---|
| Yamaha 24x8x4 SCSI CDRW Kit | -$432 |
| Yamaha 24x8x8 IDE CDRW Kit | -$381 |
| LG 32x8x4 IDE CDRW Kit | -$327 |
| LG 8x DVD Kit | -$175 |
| Ricoh 24x6x4 CDRW & DVD Kit | -$599 |
| Ricoh 32x12x6 CDR Kit | -$475 |

Monitors

| | |
|---|---|
| NEC 17"V 720 | -$433 |
| Philips 17" 107S | -$399 |
| Mitsubishi 17" 1770F | -$395 |
| Sony 17" CPD-E200 | -$676 |
| LG 17" 795FT | -$825 |
| LG 17" 775N | -$385 |
| NEC 19" V920 | -$751 |
| Philips 19" 109S | -$825 |
| NECMultisync 15" LCD 1525V | -$1875 |

Printers

| | |
|---|---|
| HP1100 (8ppm) Laserjetprinter | -$699 |
| Xerox P8EX Laser Printer | -$515 |
| Epson colour Stylus 760 | -$358 |
| Canon BJC 4650 | -$395 |

Video Cards

| | |
|---|---|
| 3D ProphetII Ultra 64Mb | -$999 |
| 3D ProphetII GTS 32Mb | -$634 |
| 3D ProphetII Dual 32Mb | -$317 |
| 3D ProphetII MX32Mb | -$279 |

Hard Drives

| | |
|---|---|
| Seagate 10.2Gb | -$213 |
| Seagate 15Gb 7200 | -$274 |
| Seagate 20Gb | -$222 |
| IBM 30Gb 7200RPM | -$350 |

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### FAXSTREAM DUET

**Choose our Low Cost FAXMATE device when you wish to use your existing Fax Machine or Modem with the new Telstra FaxStream Duet service.** Diverts calls made to your new Fax number direct to your Fax device and calls to your other number to your telephone. Connects in minutes to ANY telephone socket.



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**Choose EASY-CONNECT PRO for no compromise Fax and Modem reception on any Voice line!** Automatic Voice, Fax and Modem operation all on one line using your existing number and/or a FaxStream Duet number and/or Easycall Multiple Number. Scanning Facility will allow your Fax to be used as a Scanner for your PC.



## OPERATE your MODEM, MULTIPLE MODEMS, or your EFT-POS on your FAX LINE

### AUTO MODEM RECEPTION

**Choose FMX-PRO when you wish to fit a Modem to your Fax line and the Modem also needs to receive data calls.** Directs Fax calls to your Fax and Data Calls to Modem. Barge-in protection is provided to prevent one device interrupting the other while it is in use.



### OUTGOING MODEM or EFT-POS

**Choose AUTO-CONNECT when you wish to fit a Modem or EFT-POS unit to your Fax line, to make OUTGOING calls.** Provides automatic connection on dialing. Other device is then locked out. Ideal for connection of Payphones, Modems and EFT-POS to any Fax, Commander, PABX or any type of Telephone line.



### MULTIPLE MODEMS

**Choose AUTO-SELECT when two or more Modems need to be connected to a Fax or dedicated Modem line.** Fit up to eight Modems, or seven Modems and one Fax to the same line. Incoming calls are automatically routed to any device. Barge-in protection is provided.



## IMPROVE the EFFICIENCY or PROFESSIONALISM of any ordinary TELEPHONE LINE

### MUSIC OR MESSAGE ON HOLD FACILITY FOR ANY LINE

No longer is this important business facility restricted to Commander or PABX systems. Simply connect any radio, cassette, digital player, or even your PC to this low cost unit and add a professional touch to any existing line!



### TELEPHONE CALL TRANSFER

Now you can answer a call on one telephone and then transfer the call to another telephone fitted to the same line, using your existing telephones. You can even use your phones as an intercom. No special wiring required. Up to 8 extensions per line. Barge-in protection is also provided.



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When a visitor presses a supplied door phone mounted at your front door or gate, your telephones will ring allowing you to answer and converse from any telephone. If your line is in use, a Call Interrupt facility will alert you. You can even open the gate or door with a command from your telephone.



### HIGH QUALITY INTERCOM SYSTEM

INTERPHONE provides LOUD, CLEAR, telephone quality INTERCOM communication for 2 to 64 telephone handsets. Simply pick up any telephone and dial the desired telephone. InterPhone uses its own telephone cable, but does not connect to a Telecom line.



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### PC RESET UNIT

This low cost accessory for use with our RTA, is designed for quick and easy user fitting, direct to the back of ANY PC. Once fitted, you will be able to call in and RESET your PC from any Touch Tone Telephone, at any time, from anywhere in the world!



### POWER CONTROL UNIT

This RTA accessory provides you with a simple '2 minute plug in' solution for controlling remote electrical equipment. Once fitted, you will be able to call in and TURN ON, TURN OFF or RESET the power connected to any Electrical Device from any Touch Tone Telephone.



## TELEPHONE LINE SIMULATORS for TESTING, TRAINING or DEMONSTRATION of all TELEPHONE EQUIPMENT

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This compact low cost device allows any two Telephone devices to ring and communicate with each other, without the need to connect to Two Telecom lines. Save 25c per call. Ideal for the Testing, Training & Demonstration of all telephone devices. Operation is Bi-Directional.



### RINGMASTER PRO

Provides all of the facilities of our STD device and in addition generates Australian Dial Tone, Busy Tone and Disconnect Tones as appropriate. This unit also generates ALL EIGHT TELSTRA RING PATTERNS planned for use in Australia, including FaxStream Duet, Easycall Multiple Number and Diverted Call rings.



### RINGMASTER CLI

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***Australia's Telephone Line Sharing Company***

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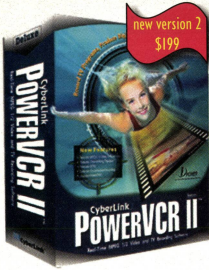
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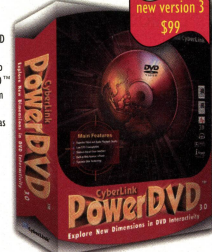



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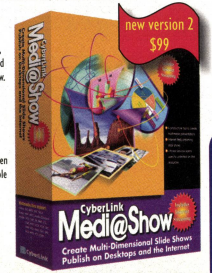
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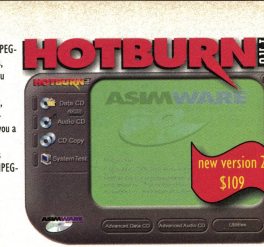

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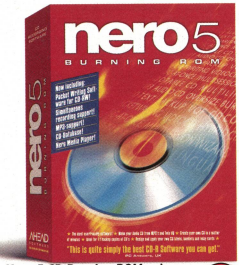
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## Computer Parts and Accessories

### CPU's

**intel**

| | |
|---|---|
| Celeron 633 | $180 |
| Celeron 667 | $190 |
| Celeron 700 | $200 |
| Celeron 733 | $210 |
| Celeron 766 | $270 |
| Pentium III 866EB | $450 |
| Pentium III 933EB | $550 |
| Pentium III 1Gb | $625 |

**AMD**

| | |
|---|---|
| Athlon 700 & fan | $250 |
| Athlon 850 & fan | $325 |
| Athlon 900 & fan | $354 |
| Athlon 950 & fan | $396 |
| Athlon 1Gb & fan | $442 |
| Athlon 1.1Gb & fan | $539 |
| Athlon 1.2Gb & fan | $600 |
| Duron 650 & fan | $137 |
| Duron 700 & fan | $155 |
| Duron 750 & fan | $178 |
| Duron 800 & fan | $210 |
| Duron 850 & fan | $255 |

### Hard disks

**Western Digital**

| | |
|---|---|
| **WD** 100AB 10Gb | $200 |
| **WD** 200EB 20Gb | $230 |
| **WD** 307AA 30Gb | $260 |
| **WD** 450AA 40Gb | $320 |

***7200 RPM***

| | |
|---|---|
| **WD** 200BB 20GB | $260 |
| **WD** 300BB 30GB | $308 |
| **WD** 400BB 40GB | $383 |
| **WD** 600BB 60GB | $450 |

**Seagate**

| | |
|---|---|
| **Barracuda** 20GB | $260 |
| **Barracuda** 30GB | $300 |
| **Barracuda** 40GB | $380 |
| Deskstar 30Gb | $330 |
| Deskstar 46Gb | $375 |
| **Hitachi** | |
| Notebook 6.4Gb | $285 |
| Notebook 12Gb | $360 |

### Motherboards

***Pentium II / III***

| | |
|---|---|
| **ASUS** CUV-4X | $230 |
| **ASUS** CUSL2 | $320 |
| **ASUS** CUSL2-c | $270 |

**GIGABYTE**

| | |
|---|---|
| GA-6VXE7+ | $155 |
| GA-6VXC7-4X | $175 |
| GA-6VM7-4X | $190 |
| GA-6VM7A | $170 |
| GA-6OXM7-E-1 | $250 |
| GA-6OXM7-E | $269 |

**MSI**

| | |
|---|---|
| MSI-6309 | $190 |
| MSI-694D Pro Raid | $320 |

**AOpen**

| | |
|---|---|
| AX34 PRO | $185 |

**PROTAC**

| | |
|---|---|
| M754LMR | $180 |
| M758LMR | $165 |

***AMD Athlon***

| | |
|---|---|
| **Gigabyte** 71XE4 | $195 |
| **Gigabyte** 7ZM | $215 |
| **Gigabyte** 7ZX | $255 |
| **ASUS** A7 | $325 |
| **ASUS** A7 pro | $290 |
| **ABIT** KT7 | $275 |
| **ABIT** KT7 Raid | $330 |
| **MSI** K7T Pro II | $240 |

### Video cards

| | |
|---|---|
| 4M 3D PCI | $50 |
| 4M 3D AGP | $45 |
| 8M AGP SIS (or 8M PCI) | $60 |
| 8M AGP (or PCI) with NTSC TV output | $80 |
| 16Mb TNT2 / 32Mb TNT2 AGP | $100 / $130 |
| 32Mb TNT2 PCI | $160 |
| 32Mb TNT2 with TV out PCI | $165 |
| 32Mb TNT2 with TV out AGP | $160 |
| 32Mb TNT2 with TV out video in (AGP) | $180 |
| **Matrox** G400 16Mb AGP | $215 |
| **Matrox** G450 32Mb Dual head AGP | $350 |

**ASUS**

| | |
|---|---|
| V7100 GeForce II MX 32Mb with TV out | $325 |
| V7700 GeForce 32Mb Pure , DDR | $499 |
| V7700 GeForce 32Mb Deluxe, DDR | $545 |
| V7700 GeForce 64Mb Pure, DDR | $745 |
| **Hercules** 3D Prophet II MX 32Mb | $236 |
| **Hercules** 3D Prophet II MX 32Mb TV out | $280 |
| **Hercules** 3D Prophet II GTS Pro 64Mb | $580 |
| **Pixelview** Geforce II MX AGP 32Mb | $250 |
| **Eagle** Geforce II MX AGP 32Mb | $220 |
| **Leadtek** GeForce 256-32MB | $350 |
| **Voodoo** III 3000 AGP 16Mb TV out | $220 |
| **Voodoo** III 3000 AGP 16Mb | $200 |
| **Voodoo** 5 5500 AGP 64Mb | $510 |

### CD Rewriters

| | |
|---|---|
| **Diamond Data** DD10432A 32x10x4 IDE | $320 |
| **LG** CED-8080B 32x8x4 IDE RW | $280 |
| **Panasonic** 7585 32x8x4 IDE CD RW Kit | $330 |
| **Acer** 8432IA 32x8x4 IDE CD RW Kit | $300 |
| **Sony** CRX140E 32x8x4 IDE RW oem | $280 |
| **Sony** CRX140S 32x10x4 SCSI RW oem | $420 |
| **Sony** CRX160E 32x10x4 IDE RW oem | $450 |
| **Sony** CRX160S 32x10x4 SCSI RW oem | $560 |
| **Ricoh** MP7063A 32x6x4 IDE rewriter Kit | $280 |
| **Ricoh** MP7083A 32x8x4 IDE rewriter Kit | $350 |
| **Ricoh** MP7120A 32x12x10 IDE Kit | $415 |
| **Ricoh** MP9060A 24x6x4 DVD & CD writer | $500 |
| **Ricoh** MP9120A 32x12x10 DVD & CDR | $620 |
| **Kodak** USB external CD writter 8x4x4 | $480 |

### Printers

**EPSON**

| | |
|---|---|
| Stylus 480 | $155 |
| Stylus 580 | $180 |
| Stylus 680 | $299 |
| Stylus 760 | $280 |
| Stylus 880 | $500 |
| Stylus 900 (12ppm) | $629 |
| Photo 720 | $325 |
| Photo 870 | $590 |
| Photo 1270 (A3) | $835 |

**Canon**

| | |
|---|---|
| BJC 1000SP | $110 |
| BJC 2100SP | $145 |
| BJC 3000SP | $235 |
| BJC 6200 | $340 |
| Laser LBP800 (8ppm) | $480 |

**hp**

| | |
|---|---|
| HP 640C | $170 |
| HP 840C | $260 |
| LaserJet 1100 (8ppm) | $700 |
| **Panasonic** KX6100 | $305 |

### Scanners

**Artec** Ultima 2000 $100

**Acer**

| | |
|---|---|
| 640U | $130 |
| 640P Vuego | $130 |
| 640UT Vuego | $245 |
| **Canon** N340P | $115 |
| **Canon** N640P | $139 |
| **Canon** N650U | $169 |
| **Canon** N1220U | $255 |
| **Canon** N660U | $255 |
| HP 4300C | $290 |

### Add on cards

| | |
|---|---|
| Promise U100 | $90 |
| Promise U100 RAID | $226 |
| PCI SCSI II card | $50 |
| USB PCI card | $45 |

### Sound Cards

| | |
|---|---|
| ISA / PCI Sound | $25 |

**Sound BLASTER**

| | |
|---|---|
| PCI 128 oem | $45 |
| Live oem | $105 |

### Memory

| | |
|---|---|
| 64Mb SDRAM | $60 |
| 128Mb SDRAM | $120 |
| 32Mb EDO 72pin | $120 |

### Modems

| | |
|---|---|
| 56K Internal | $50 |
| **Netcomm** 56K Int. | $60 |
| 56K External | $90 |
| 56K USB Modem | $90 |
| **Netcomm** Mega-I | $99 |
| **Netcomm** Roadster II (USB / Com) | $190 |
| **U.S Robotics** 56K | $180 |
| PCMCIA 56K | $140 |

### Networking

| | |
|---|---|
| Network card 10Mb | $22 |
| Network card 100Mb | $30 |
| 5 Port Hub 10Mb | $50 |
| 8 Port Hub 10Mb | $64 |
| 5 Port Hub 100Mb | $90 |
| 8 Port Hub 100Mb | $165 |
| USB Hub 4 port | $60 |
| Printer Switch 2 in 1 | $20 |

### Removable Storage

| | |
|---|---|
| 1.44Mb Floppy | $28 |
| 120Mb Floppy | $130 |
| 120Mb disk | $18 |
| 100Mb Zip Internal | $110 |
| 100Mb Zip disk | $17 |

### Cases

| | |
|---|---|
| ATX Midi case | $55 |
| ATX Full tower case | $110 |
| ATX **Aopen** HX45 | $100 |
| ATX **Aopen** HQ-08 | $185 |

## Maxima

- 128M SDRAM PC133
- 20GB HDD
- 1.44M Floppy.
- 32M TNT2 Video card
- S/B 128 3D Sound card
- 50x CD Rom
- 17" SVGA Monitor
- Subwoofer Speakers
- Midi ATX case
- Acer Keyboard
- Logitech Intelligent Mouse & Pad

| | |
|---|---|
| Celeron 633 | $1570 |
| Celeron 700 | $1630 |
| Celeron 766 | $1720 |
| Pentium III 866 | $1860 |
| Pentium III 933 | $1960 |
| Pentium III 1Gb | $2060 |

## AMD Plus

- 64M SDRAM PC133
- 10GB HDD
- 1.44M Floppy.
- 8M Video card
- 3D Sound card
- 48x CD Rom
- 15" SVGA Monitor
- 180W Speakers
- Midi ATX case
- Win98 Keyboard
- A4 Mouse & Pad

| | |
|---|---|
| Duron 650 | $1180 |
| Duron 700 | $1200 |
| Athlon 700 | $1300 |
| Athlon 850 | $1380 |
| Athlon 900 | $1420 |
| Athlon 1Gb | $1550 |
| Athlon 1.2Gb | $1750 |

## Value

- 64M SDRAM PC133
- 10GB HDD
- 1.44M Floppy.
- 16M Video card built_in
- PCI 3D Sound card built_in
- 56K Modem built_in
- 48x CD Rom
- 15" SVGA Monitor
- 180W Speakers
- Midi ATX case
- Win98 Keyboard
- A4 Mouse & Pad

| | |
|---|---|
| Celeron 633 | $1050 |
| Celeron 700 | $1100 |
| Celeron 766 | $1190 |
| Pentium III 866 | $1360 |
| Pentium III 933 | $1480 |
| Pentium III 1Gb | $1590 |

### Blank CD

| | |
|---|---|
| Laser / LG | $1.5 |
| Kodak / TDK / Verbatim | $1.8 |
| Rewritable Laser | $4.0 |
| Rewritable Kodak/TDK | $6.0 |

### Add on card

| | |
|---|---|
| Promise ATA100 IDE | $90 |
| PCI SCSI II card | $50 |
| PCI USB Ports card | $45 |
| ISA Printer card | $25 |

### Software

| | |
|---|---|
| Windows Millennium | $200 |
| Windows 2000 oem-Full | $300 |
| MS Work Suite 2000 oem | $140 |
| MS Office 2000 | |
| Small business oem | $380 |
| MS Office 2000 oem | |
| Professional-Full | $550 |

## SYSTEM OPTIONS

### Monitors

| | |
|---|---|
| 15" **Acer** 54el. | $250 |
| 15" **Samsung** 55E | $250 |
| 15" **LG** 520Si | $250 |
| 15" **Mitsubishi** Diamond | $250 |
| 17" **Targa / KDS** | $360 |
| 17" **Acer** 77C | $380 |
| 17" **Diamond View** 1770f | $380 |
| 17" **LG** 775N | $380 |
| 17" **Samtron** 75E | $380 |
| 17" **Hitachi** CM615ET | $395 |
| 17" **Diamond View** 1772 le | $470 |
| 17" **Sony** CPDE220 | $680 |
| 19" **LG** 995E | $795 |
| 19" **Sony** CPD-G400 | $1245 |

### Cd Rom / DVD Rom

| | |
|---|---|
| 48x or 50x or 52x CDROM | $80 |
| DVD 8x **Hitachi** | $190 |
| DVD 12x **Creative** | $200 |
| DVD 16x **Pioneer / Diamond** | $220 |
| DVD 16X **Aopen / Acer** kit | $260 |

### Speakers

| | |
|---|---|
| 120W SPKs. / 480W $15 / $30 | |
| 400W SPKs. mini subwoofer | $40 |
| 600W Sub-WooFer SPKs. | $70 |
| 980 Watt Sub-Woofer SPKs. | $90 |
| **Creative** FPS1000 4 point | $180 |
| Altec Lansing Acs22 / 33 | $45/$90 |

### Mouse

| | |
|---|---|
| **A4-tech** PS/2 or Serial | $8 |
| **A4-tech** PS/2 Wheel | $15 |
| **A4-tech** wireless PS/2 | $30 |
| **A4-tech** Scroll Track | $30 |

**Logitech**

| | |
|---|---|
| PS/2 Mouse | $15 |
| Wheel Mouse (PS/2&USB) | $30 |

**Microsoft**

| | |
|---|---|
| Intelligent Mouse (PS/2) | $35 |
| Intellieye Mouse Optical | $67 |
| Intellimouse Explorer | $80 |
| **SAMSUNG** Cyber optical | $50 |

### Keyboards

| | |
|---|---|
| Windows 98 K/B (AT&PS/2) | $15 |
| **Acer** K/B (AT&PS/2) | $20 |
| Multimedia K/B (AT) | $25 |
| Internet K/B (PS/2 or AT) | $35 |
| **Logitech** Internet K/B (PS/2) | $45 |
| **Logitech** Cordless iTouch | $150 |
| **Honeywell** Space mate K/B | $40 |
| **HoneyWell** Multimedia K/B | $60 |
| **MS** Internet K/B | $40 |
| **MS** Nature K/B | $45 |
| **MS** Internet pro K/B | $57 |
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- Std. - Upgrade **$462**
- Std. - New Install* **$612**
- Pro. - Upgrade **$599**
- Pro. - New Install* **$749**
- Prem.- Upgrade **$660**
- Prem.- New Install* **$810**




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**FireWorks**
Version 4 - **$659**

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|---|---|
| ABC FlowCharter V7 | $295 |
| Adobe Acrobat V4 - New Install | $489 |
| Adobe InDesign **V1.5** | $1429 |
| Adobe PageMaker 6.5 PLUS | $1095 |
| Adobe Photoshop **V6.0 NEW** | $1369 |
| Arcserve 2000 W/Group Ed | $925 |

**Office 97 Professional**

| New Install | Upgrade |
|---|---|
| $480 | $380 |

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| | |
|---|---|
| AutoCAD LT 2000i **New!!!** | $1296 |
| AutoCAD LT 2000i - Upgrade | $375 |
| Borland C++ Build.Pro**V5** - New | $900 |
| Borland J Build.Pro**V4** - New | $900 |
| Borland J Build.Pro**V4** - Upgrade | $550 |
| Borland Delphi Pro V5 - Upgrade | $428 |
| Borland Delphi Pro V5 - New Inst. | $900 |

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| | |
|---|---|
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| Corel W/Perfect Office 2000 Upg | $299 |
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| CorelDRAW V9 - Upgrade | $460 |
| CorelDRAW V10 - New Install* | $850 |
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| Crystal Reports Pro V8 | $799 |
| Crystal Reports Pro V8 Upg | $410 |
| Diskeeper V6 for NT Workstation | $109 |
| Diskeeper V6 for NT Server | $528 |
| Dragon Nat. Speaking Pref. **V5** | $340 |
| Drive Image Personal Edition **V4** | $125 |
| Easy CD Creator Deluxe V4.x | $154 |
| Filemaker Pro V5 | $429 |
| Lotus Smartsuite Millen. V9.6 Full | $425 |
| Lotus Smartsuite Millen. V9.6 Upg | $309 |
| Macromedia Dreamweaver 4 - **NEW** | $659 |
| Macromedia Fireworks 4 - **NEW** | $659 |
| Macromedia FLASH **V5** | $789 |
| Macromedia Freehand **V9** | $739 |
| MS FrontPage 2000 | $190 |
| MS FrontPage 2000 - Upgrade | $99 |
| MS Project 2000 | $870 |
| MS Project 2000 - Upgrade | $360 |
| MS Publisher 2000 | $159 |
| MS Publisher 2000 - Upgrade | $130 |
| • **SPECIAL** - MS VisualBasic V6 Pro | $969 |
| MS Windows 98 2ndEd New Install | $399 |
| MS Windows 98 2ndEd Upgrade | $199 |
| MS Win 2000 Pro Upgrade (NT) | $279 |
| MS Win 2000 Pro Upgrade (95/98) | $395 |
| MS WinNT Client Licence | $55 |
| MS Works 2001 (V6) | $104 |
| MS Word 97 *Special Offer* | $348 |
| MS Word 2000 *Special Offer* | $360 |
| • **SPECIAL** - MS VisualStudio Pro | $1769 |
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| MYOB Accounting V10 - **NEW !!!** | $348 |
| MYOB Plus V10 -inc. Payroll | $495 |
| MYOB First Accounts | $186 |
| Norton AntiVirus 2001 | $84 |
| Norton SystemWorks 2001 Std *(*after $40 Cashback)* | $120* |
| Norton Utilities V2 for WinNT | $72 |
| Norton Ghost - 10 user | $380 |
| Norton Ghost 2001 **NEW** | $125 |
| OmniPage Pro V10 - New Install | $580 |
| OrgPublisher Personal | $950 |
| Paintshop Pro V7 - **New Version** | $208 |
| Paintshop Pro V7 - Upgrade | $125 |
| Partition Magic **V6** | $129 |
| PhotoImpact **V6** - **New** | $209 |
| Quark Express V4.1 | $3100 |
| QuickBooks **V7.x** **GST Ready!!** | $239 |
| QuickBooks with Payroll V7.x | $459 |
| QuickBooks Pro V7.x | $330 |
| QuickBooks Pro with Payroll V7.x | $669 |
| Seagate B/up **V8.5** - NT Server | $1225 |
| Seagate B/up **V8.5** - NT Serv. Upg | $649 |
| Seagate B/up **V4.5** Desktop Pro | $195 |
| Smarterm Essentials V9 | $325 |

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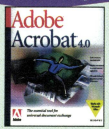

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|---|---|
| Thumbs Plus | $139 |
| TypeQuick (for Windows) | $89 |
| VET Net Surfer AntiVirus | $87 |
| VISIO Tech 2000 - New Install | $660 |
| VISIO Std 2000 - New Install | $350 |
| WinZIP **V8** | $63 |

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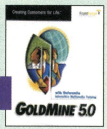
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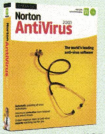




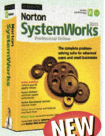
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| EC-07 | EPSON S020108 (BLACK) (FOR EPSON STYLUS COLOUR 800, 850, 1520) | $26.50 |
| EC-08 | EPSON S20110 (COLOUR) (FOR EPSON STYLUS PHOTO, PHOTO 700, PHOTO EX) | $30.50 |
| EC-10 | EPSON S020097 (COLOUR) (FOR EPSON STYLUS COLOUR 200, 500) | $29.80 |
| EC-19 | EPSON S020187 (BLACK) (FOR EPSON STYLUS COLOUR 440, 460, 640, PHOTO 750, PHOTO 1200) | $26.80 |
| EC-20 | EPSON S020191 (COLOUR) (FOR EPSON STYLUS COLOUR 440, 640, 740) | $30.80 |
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| Princo 74 minute HIGH SPEED ReWritable Media | $6.90 |
| Princo 3.95Gb DVD-R | $39.95 |
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| Princo 74 minute Silver/Blue Media | $7.99 |
| Princo 80 minute Silver/Blue Media | $9.99 |
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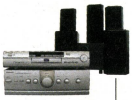
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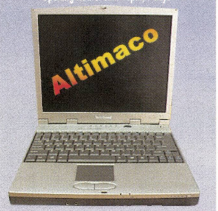
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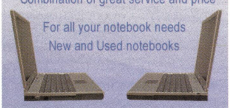
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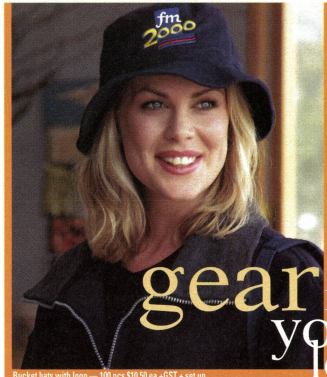

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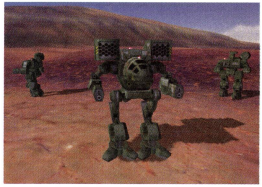
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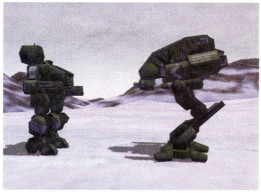
## Mechwarrior 4: Vengeance

Computer game franchises never die. The developers just change the number at the end of the title, upgrade a few details and re-release it, year after year. That's the popular method of releasing game sequels, such as Tomb Raider, EA's sports series and a host of others. Thankfully, Mechwarrior 4 does not fall victim to this 'sequelitis'.

The basic theme hasn't changed much — wander around in a gigantic robot suit, blowing the arms and legs off other people in gigantic robot suits — and perhaps it's this consistency that makes people buy all these sequels.

Some parts of the game have been completely rebuilt. FASA, who originally created the entire Battletech universe, was bought out by Microsoft last year — and not because Microsoft wanted in on the tabletop war-gaming market. FASA's involvement has provided a stronger sense of continuity within the Battletech universe. This translates into more enemies of all shapes and sizes. Mechs are meant to be huge, but it's only when you destroy a tank simply by stepping on it that the sense of scale is properly conveyed.

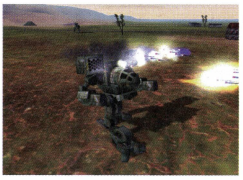




The game looks great, even on a mid-range system. The rather drab worlds of Mechwarrior 3 are gone, replaced with a great deal of detail that has somehow been squeezed in without adversely affecting frame rates. Of course, the better your gaming setup, the more detail you see.







If you've never played a Mechwarrior game before, the combination of first person shooter, flight sim and tactical simulation is a little overwhelming at first. There is a tutorial mode, but it's extremely basic — even after completing it you still waddle around firing off all weapons at once. It's only in the heat of battle that you eventually come to grips with all the intricacies of your mech.

It's also worth investing in a good quality gamepad or joystick with plenty of options — the more controls you have, the more you can do with your mech without having to resort to the keyboard. If you use a force feedback gamepad, it rumbles from side to side as each leg makes contact with the ground. Neat.

Experienced Mechwarrior players may find the going a little easy in the opening sections of the single player game. The story-line is straight out of classic science fiction — a lone warrior out to regain control of a besieged planet. Honestly, you'd think FASA had never even heard of George Lucas. The linking cut scenes and in-game audio contribute a lot to the creation of a richly detailed virtual planet. There's also the usual range of multiplayer options for solo mech pilots and teams.

Another factor that's always made Mechwarrior popular is the mech design facility. This has been changed considerably for this release. In previous Mechwarrior games, almost any weapon could be put onto any connection spot. In Mechwarrior 4, different mech designs mean weapons can only be placed on specific points, which limits the number of mechs you can create. Of course, all players have this same limitation. The emphasis appears to be on using a simpler design to make newer players more comfortable.

If you haven't played a Mechwarrior game before, Mechwarrior 4 is a great choice. However, experienced players may find it a little simple. Existing addicts should have already rushed out and bought copies — so, what are the rest of you wasting time reading this for?

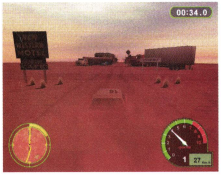
***Alex Kidman***

**Contact** Microsoft
**Phone** 13 20 58
**Online** www.microsoft.com/games/mechwarrior4
**Price** $98.95
**Requires** Pentium II 300, Windows 95, Windows 2000, 64M RAM
**Classification** M(15+)
**Rating** ▮▮▮▮▮▮▮▮▮▮

## Pro Rally 2001

Recent rally driving simulations are superb. Rally Championship 2000, Michelin Rally Masters and Colin McRae Rally 2.0 have all pushed the genre to new heights — and also made it increasingly difficult for newcomers to succeed. Pro Rally 2001 from Ubi Soft is the latest attempt to break into this increasingly lucrative market — and sadly, it fails where the others succeed.

Standard arcade, time trial, championship and multiplayer modes of play are offered, as well as a driving school section. The arcade mode presents the typical 'race against the clock' scenario. However, Pro Rally is unique in that drivers must catch up with the car in front to gain a time extension.




The championship season forms the basis of all rally games. As in the PlayStation's Gran Turismo, gamers must complete a series of tests (10 in this case) in the Driving School before being




admitted to the championship. These tests are exceedingly difficult; so difficult, in fact, that they may deter many gamers from continuing. However, they ensure that all those who progress to the championship are competent drivers and will be able to compete effectively. The championship season provides varied terrain including gravel, bitumen and snow, and there are obstacles such as jumps, rivers and bridges to ensure an exciting rally.

Pro Rally 2001 has most of the elements that constitute a great game, but it falls short in two vital areas. The physics engine is the most important element of a driving game — and Pro Rally's is poor. The car frequently feels like it's on rails, and fails to convey a sense of driving at breakneck speed through difficult terrain. This problem is further exacerbated by the substandard sound effects; they're so ineffectual that they don't even give a clear idea of when to change gears.

Despite being moderately entertaining, Pro Rally 2001 cannot compete with the many excellent products available in this genre. It is difficult to recommend it when there are so many superior games out there.

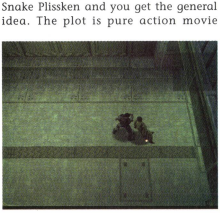
***Alan Crawford***

**Contact** Ubi Soft
**Phone** (02) 9362 1414
**Online** www.ubisoft.com
**Price** $76.95
**Requires** Pentium II 300, Windows 95, 32M RAM
**Classification** G
**Rating**

## Metal Gear Solid

When Metal Gear Solid came out on the PlayStation over a year ago, it was a revelation. It was a little short, but the gameplay was solid, the plot intriguing, and you got to creep around hallways strangling guards. It doesn't get better than that. Konami produced the original, but Microsoft have snapped up the licence for PCs. So, was the wait worth it?

Well, the game is still great. You play special agent extraordinaire, Solid Snake. Think James Bond crossed with Snake Plissken and you get the general idea. The plot is pure action movie



mixed with a touch of suspense, but we won't give away the plot here. Suffice to say that, once again, the hero is trapped,



weaponless and facing insurmountable odds. Should be a piece of cake.

Visually, Metal Gear Solid is only a touch better than its PlayStation counterpart; you can push the resolution up but that's about it. Controlling Snake is reasonably easy with a keyboard or gamepad, but it takes a while to learn how to sneak around (especially so you can strangle guards quietly). It's all quite engaging, and you're unlikely to get bored — except perhaps during the cut scenes, where massive chunks of exposition pour forth from characters who invariably die anyway.

The add-on VR Missions pack is also included. It's good, but plotless; you run through a series of training missions that get progressively harder.

If you haven't already played the original (and can't pick it up cheaply), then Metal Gear Solid comes highly recommended. It won't take you long to finish, but it'll keep you entertained while it lasts.

***Alex Kidman***

**Contact** Microsoft
**Phone** 13 20 58
**Online** www.metalgear.com
**Price** $79
**Requires** Pentium 266, Windows 95, 32M RAM
**Classification** MA(15+)
**Rating**

## Zeus: Master of Olympus

Zeus is the latest in Impressions Games' classical city-building series and, like Pharaoh and Caesar 3 before it, it is enjoyable, addictive and deceptively sophisticated.

The setting is ancient Greece during the heroic age, a time of monsters (bad), heroes (good) and gods (either). This may offend those who demand historical accuracy in their sims, but Impressions Games has always erred on the side of fun, and in Zeus it has produced its most fun game yet.

As usual, the objective is to develop your city from a humble settlement to an economic, social and cultural powerhouse. You add stadiums, wineries and other facilities to attract immigrants, and pay for them all with the export income generated through trade in anything from olive oil to classical sculpture. The Greek city-state is a central theme of the game and as a result, diplomacy, trade and warfare all feature much more prominently than they have in the past.



The scope of the game has been broadened, but deployment of buildings and streets has been simplified. As it's no longer necessary to place industrial buildings within walking distance of houses, city planning is much easier and the game's pace is faster.

The mechanics of city management have also been improved, thanks to an intuitively designed side panel and well-ordered information windows. As in other games in the series, your citizens are a diverse bunch, and as they wander the streets, you can click on any of them to get appropriate and sometimes humorous advice on what your city most needs.

In another significant improvement, you no longer have to start a new city with each scenario. Instead, the campaigns follow a narrative structure. Your city is retained as you progress through each chapter.



The graphics are a real treat — colourful, lively and thoroughly in keeping with this enjoyable and diverting game.

*Jon Gill*

**Contact** Jack of All Games
**Phone** (02) 9482 3455
**Online** zeus.impressionsgames.com
**Price** $87.95
**Requires** Pentium 266, Windows 95, Windows 2000, 64M RAM
**Classification** G(8+)
**Rating** ▮▮▮▮▮▮▮▮▮▮

## Tony Hawk Pro Skateboarder 2

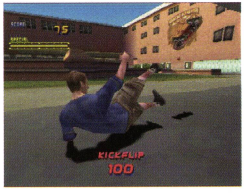
It's safe to say that the arrival of Tony Hawk Pro Skateboarder 2 signalled an end to serious work at *APC*. The sequel to the highly successful PlayStation game has bucked the console-first trend and arrived almost simultaneously on the PC. The PC version is a lot of fun for quick bursts of gameplay, but it also has a lot of depth.

To start, you pick a character from a line-up of famous skaters or create one yourself. Your objective is to earn as much money and prestige as possible by performing tricks.

It's here that reality takes a quick trip to the bathroom, as your skater flies ludicrous distances into the air, spins around, lands on his or her head and then walks away with nary a scratch. It's all part of the fun really.

As you progress through the game, new skills and stunts can be purchased, allowing greater scores to be achieved and higher levels to be unlocked. Some of the objectives are quite hard to achieve, but not impossible with a little lateral thinking and a few well-timed jumps.




You mightn't know what a Benihaha or 720 Melon are, but you'll be happy with yourself the first time you pull them off without breaking both arms — and more importantly, without breaking the time limit. There is a plethora of hidden levels and features that only become available through dedicated play, from levels featured in the original game to the option of playing as Spiderman — a feature that has to be seen to be believed.

Tony Hawk Pro Skateboarder 2 is a lot of fun and very addictive. Don't say we didn't warn you.

*Alex Kidman*

**Contact** Activision
**Phone** (02) 9869 0955
**Online** www.activision.com
**Price** $79.95
**Requires** Pentium 233 MMX, Windows 95, 32M RAM
**Classification** G(8+)
**Rating** ▮▮▮▮▮▮▮▮▮▮

## EA Sports FIFA 2001

EA does it every year; it releases several licensed titles at once, then waits for the money to come pouring in. The most recent offering is FIFA 2001. If you already have any FIFA game after FIFA '98, don't bother with this one as it's very similar to the others. Unless, of course, the rosters are profoundly important to you.

The latest instalment looks a little better than previous versions, but not much. The graphics are quite stunning; the players move fluidly, heading, kicking and slide tackling their little digital hearts out. The range of teams to choose from is huge, as is the variety of game types, from simple friendlies to full-blown league competitions. EA has sewn up a number of major licences, so most players and teams are in there somewhere.

**Contact** Electronic Arts
**Phone** (02) 9955 7744
**Online** www.ea.com
**Price** $76.95
**Requires** Pentium 166, Windows 95, 32M RAM
**Classification** G
**Rating** ■■■■■■■■■■

Control is as good as it ever was, but there are still a few areas where in-game logic needs improving, especially around the goal mouth. Set pieces are far more likely to work than individual shots, but all too often the follow-up player in a set piece just stands around waiting for the ball to come down, at which point the goalie picks it up.

True to its console heritage, FIFA 2001 plays much better with a gamepad than a joystick. However, there isn't an option to remap button assignments — on some pads this means that the sprint button ends up in an odd position.

One area EA has improved considerably is the commentary, and this year there's plenty of it. Sure, you'll eventually hear everything they have to say, but it'll take a considerable amount of time to do so, and it adds a lot to the mood of the game.

FIFA 2001 is an awful lot like FIFA 2000 — very good fun to play.

***Alex Kidman***






## Insane

Few new racing games have been released lately. Several have come and gone, but none have been very successful. Most racing games have you racing your vehicle around predefined courses and a series of checkpoints, but the developers of Insane have moved away from this conventional model. The game is not as crazy as the title suggests, but it features some great racing action and some slightly strange modifications.

The team at Invictus has come up with astoundingly realistic vehicle models. This becomes particularly evident as you work your way through the levels and the vehicle hierarchy. The dynamic variation of the individual vehicles is great; each has a unique centre of gravity and mass, as well as the usual engine size, power and handling features.

To become a successful driver, selecting a car appropriate to the level is imperative. A ground-hugging dune buggy is great for some levels, but you have to upgrade to a truck if you want to smash through some of the bigger hills. The excellent damage system (real time visible damage) means that if you drive haphazardly, you may end up trying to




finish the race in a twisted mass of metal with only three wheels.

The single player mode can become quite tedious after a while, but the great multiplayer support means this isn't very important. There are no dedicated Insane servers, but all games are played peer to peer and it's quite easy to set up and start racing quickly. The strange modifications mentioned earlier seem to have been taken straight from a first person shooter. There are a couple of different styles of races available: Capture the Flag, Return the Flag and Destruction Zone. These may sound slightly out of place in a racing game, but they fit in perfectly, making it fun to play and interesting to watch.

The excellent physics, damage model and multiplayer support mean Insane is exactly what the developers set out to produce: a fast and furious online racer, giving gamers the much-coveted ability to smash up some cars with their mates.

***Ryan Shaw***

**Contact** OziSoft
**Phone** (02) 8303 6800
**Online** www.codemasters.com/insane
**Price** $89.95
**Requires** Pentium 233, Windows 95, 64M RAM
**Classification** G
**Rating** ■■■■■■■■■■

## American McGee's Alice

American McGee was one of iD Software's level designers who worked on Doom II and the Quake series. This is his reworking of Lewis Carroll's Alice in Wonderland stories — but the familiar tales have taken on a darker and more sinister tone.

Alice has returned home from Wonderland, but after her parents are killed in a fire she lapses into a catatonic state and is taken to an asylum to recuperate. As the years go by there is no change in her condition — she rarely responds to stimuli — but when a nurse brings in Alice's old stuffed toy rabbit it causes a reaction.

In Alice's mind she re-enters Wonderland, but this time it's vastly different from the world she originally imagined. The landmarks, buildings and mechanics are all oddly skewed. The inhabitants have been oppressed under the rule of the mad Red Queen, who has damaged the land and enslaved or murdered much of the population. With Wonderland poisoned, it is up to you as Alice to set things right.

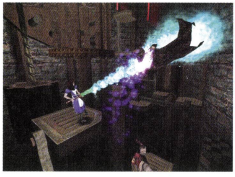
Helping you out with not-so-cryptic clues is the Cheshire Cat, who has been transformed into a tattooed and decidedly bestial thing — but he's a suave and calming presence nonetheless. Other allies include the Mock Turtle and the White Rabbit. Enemies include the Mad Hatter, Centipede and the Card Guards.

The game is a third person shooter, but like the Tomb Raider series, the emphasis is much more on exploration and level design than on combat. The level designs, graphics and textures are some of the best *APC* has seen in any game. You need a very powerful computer to run this game but the results are definitely worth it. A lot of time has gone into designing the levels and there are plenty to explore.

Through fractured landscapes of fire, twisted clockwork worlds, chess realms and tunnels of ice, Alice must venture closer and closer to the Red Queen's stronghold. The levels have so much incidental stuff happening in the background that at times you want to explore the layout completely. Walls undulate, clocks twist and there's bizarre machinery. It all adds to the tremendous atmosphere of the game.

With Alice trapped in the distorted Wonderland created by her own psyche, two bars represent your current levels of sanity and will. The red sanity bar can be thought of as health, and the blue will bar as weapon energy. Should the sanity drop to zero, Alice is dead.





The weapons you find and use throughout the game are variations on games Alice plays in the books, such as cards, dice and jacks. Each weapon has a secondary fire mode, but it's wise to keep an eye on your will level, as some weapons drain it very quickly. To replenish sanity and will there are power-ups scattered around each level. Every time you kill an enemy, some life force appears which works like an additional power-up. A problem with the weapons is that they aren't evenly matched — the jacks, for example, are more powerful than any of the other weapons.

The game is very linear at times, and the enemy AI leaves something to be desired, but you don't really notice it as you're playing the game. The sound effects, great voice acting and musical score by Chris Vrenna (one of the founders of Nine Inch Nails) add a lot to the atmosphere. This is a great game and there are even plans to make it into a movie.

*Darren Ellis*

**Contact** Electronic Arts
**Phone** (02) 9955 7744
**Online** alice.ea.com
**Price** $87.95
**Requires** Pentium II 300, Windows 95, 64M RAM
**Classification** M(15+)
**Rating**

## Gamespy

● A new game based on the classic John Carpenter film *The Thing* is currently in the works. Carpenter's movie stars Kurt Russell as helicopter pilot MacReady. Along with a group of scientists, MacReady becomes stranded at an isolated Antarctic base with a less-than-benevolent, shape-shifting alien. Computer Artworks, which previously created Evolva, a unique squad-based third person shooter (see *APC* September 2000, page 185), is developing the new game. Said to be a mix of action and survival/horror, it apparently picks up the narrative where the movie ends. The Thing will use the same engine as Evolva, widely known for its ability to render impressive-looking organic structures. Expected for release in 2002, it will appear on PC, PlayStation2, Xbox, GameCube and Gameboy Advance.




● An interesting fan-based remake of the original Ultima is also under construction. Provisionally called Ultima 1 — a legend is reborn, it is being made as a 3D first person RPG. An early tech demo available on the game's Web site shows promise, and its 3D engine is quite impressive for a fan-based project. The best news for gamers is that, once completed, it will be available for free download. For more information see www.peroxide.dk/ultima.



## Extra! Extra!

Included on this month's cover CD is the full version of Ultima Online: Renaissance for your playing pleasure. For details, see CD 2.

# Best ever fighting games

*Before seeing* Fight Club, APC *employees used to kick each other's butts digitally. Now we use each other as real-life punching bags instead. However, if you prefer to stick to the virtual kind of fighting and keep your teeth, check out* APC*'s roundup of the best ever fighting games.*

## Street Fighter II (Arcade)



This was once the big kahuna of all those one-on-one fighting games that are such an integral part of today's gaming landscape. In 1991, this two-player fighting game took the video gaming world by storm, condemning pimply teenagers to poverty as they spent all their lunch money trying to learn special moves and master their chosen character. Not even the seemingly endless parade of lacklustre sequels can tarnish Street Fighter II's esteemed place in our memory.

## Bushido Blade (PlayStation)



Bushido Blade takes a fairly standard 3D fighting game, populates it with an army of sharp slicing weapons, and puts in one very important condition: a single good hit kills instantly. This changes the normal 'charge in to the death' strategy all too common in other titles and forces you to plan strikes and parry lethal combinations. All these, combined with a single-player mode that enforces honourable fighting conduct (no backstabbing), make a great sword-based fighting game.

## International Karate + (C64, Amiga)



Way of the Exploding Fist came first (and it was Australian, too), but International Karate + is still the best 8-bit, one-on-one fighting game. The combination of an amazing range of moves, a spot-on control system and subgames involving flashing balls, put International Karate + way ahead of its time. There's even a hidden option to drop your trousers at a single keystroke; now that's the kind of innovation *APC* usually only dreams of.

## Super Smash Bros (N64)

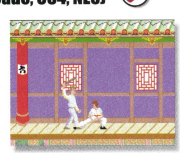



Pika! Pika! WHACK! That's the sound of an annoying yellow rat being smacked in the head by an irate gorilla — who then watches the rat fall off the side of the screen and plummet to its (preferably gory) death.

Up to four players can play with a variety of characters and some fantastically designed levels. There's no blood, which should please parents, but for us, it's all about the simian versus rodent violence.

Wouldn't that make a great Jerry Springer topic?

## Kung Fu Master (Arcade, C64, NES)



You play Thomas, the bad guy is Mr X, and you're rescuing Sylvia. That's the entire plot of Kung Fu Master, and it leaves plenty of time for kicking the butts of the strangest enemies you're ever likely to see. There are stock standard thugs, body-flipping midgets and hunchbacks with exploding heads. It's not a complex fighting game (you can only punch, kick and jump), but it has aged gracefully and still presents a challenge to gamers.

## Virtua Fighter 2 (Arcade, Saturn)



Sega's luck hasn't been too good lately, but it's still got the Virtua Fighter franchise to fall back on — and Virtua Fighter 2 was the best of them. The jumping is a bit suss, but otherwise Virtua Fighter is about as close as you'll get to beating people up without losing teeth. The tactics behind what attacks to use in which situations are easy enough to learn but, as they say in the classics, difficult to master. Unfortunately, the PC port is pretty dodgy.

## Wrestlemania 2000 (N64)




If there's one thing *APC* likes in a fighting game, it's being able to create the boss. If there's another, it's having the opportunity to hit him repeatedly with a metal chair until he passes out. This is exactly what Wrestlemania 2000 offers, and it's something we could spend all day doing.

Four-player fighting makes for some interesting alliances and betrayals, and the absence of an energy bar provides some tense moments as you try to gauge exactly when to pin your opponent. The career mode has your character (either your own creation or a stock WWF star) vying for a variety of belts in a staggering array of matches.

This is a game you'll be playing for a long time.

## Mortal Kombat II (Arcade)




Mortal Kombat followed hot on the heels of Street Fighter II. The first real competitor to the Street Fighter series, it spawned a plethora of well-endowed sequels, along with two movies and a TV series. The game provides bucketloads of gore with its 'fatalities' — finishing moves that destroy your opponent in unique and often bloody ways. Mortal Kombat II was the watershed of the series. It has faster gameplay than the original, but it still retains the same dope moves and fatalities that made the original so popular. Additional characters, 'animalities' and 'babalities' also improved gameplay. Many an hour has been spent arguing over whether Street Fighter II or Mortal Kombat II is the better game, but the question remains unresolved.

## Tekken 2 (Arcade, PlayStation)



In the history of 3D fighting games, Tekken 2 is neither the first nor the flashiest. However, it comes close to being the best for its time. The PlayStation version of the arcade game is excellent. First-rate character animations give it extra appeal compared with others in its class.

The game provides the extra movement options of pouncing, diving and rolling, as well as some amazing multiple-hit combos. Tekken 2 has the most fantastically nonsensical game endings you could possibly think of (if anyone out there can figure out what's going on in these, please fill us in). It's basically an awesome fighting game.

## Double Dragon (Arcade)



Ahhh, Double Dragon: the game that makes an art form out of sadistically beating down your opponents with poorly rendered whips, knives and baseball bats.

Following the same time-honoured plot found in a thousand bad action films, Billy and Jimmy Lee, two brothers, must save Billy's kidnapped girlfriend from the evil Mr Big. Technically this isn't a conventional one-on-one fighting game, but this subgenre (which includes other classics such as Final Fight and the arcade version of Teenage Mutant Ninja Turtles) was a starting point for Street Fighter II and its ilk. The game's highlight is simple: it has the most lethal elbow move of any game.

## As good as a Bruce Lee flick

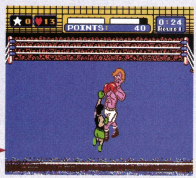
**Pit Fighter**

**Karateka**

**Dead or Alive 2**

**Punch Out** • • •

**Soul Blade**




## As bad as Elvis's karate

**BIO Freaks** • • • • •

**Rise of the Robots**

**Shaq Fu**

**Primal Rage**

**Masters of Teras Kasi**






# Two's company three's a collection

*MP3s, DVDs, bits of string — most people collect something. Small collections are easy to organise, but what if you have 3,000 garden gnomes to keep track of?* ***Alex Kidman*** *takes an orderly look at collection organisation software.*

Large collections can easily become unwieldy. There's nothing worse than buying a second copy of that rare *Richard Simmons sings Marilyn Manson (Moog Remix)* album because you forgot you already have it.

What you need is organisation. Plenty of machines already have database software on them, but to use it you need to learn how to set up and administer databases. You can always type a list into a word processor or spreadsheet program, but it won't have the searching flexibility of a database. This is where collection software comes in. These programs have fixed database formats suited to particular collections. Most collection software is aimed at common collectibles, such as music, video or books, but there are some programs available for more esoteric collections.

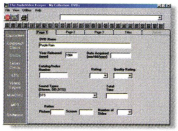
The first step with any collection software is to enter the details of your collection. Depending on your choice of software, this can involve hours (or days) of typing into little text boxes. Better programs allow for simple text imports. This is much quicker, and less likely to adversely affect your sanity. If you're planning to index your collection for insurance purposes, make sure you can enter values and invoice numbers. Above all, make sure you can export in a format your insurance company will accept. At the very least, you should be able to print out a list of your collected items.

Organising your collection can improve its quality and increase its value. Apart from giving you a clearer idea of what you have, it allows you to compare the quality of individual pieces. This is ideal if, for example, you regularly trawl eBay for additions. After all, there's little point buying that plaster cast of Gene Simmons's tongue if the one you already have is better than the one for sale.

Collections can get awfully large and hard to sort, so *APC* was keen to see just how complex each program was and how easy each was to use. There is no shortage of software designed to help you organise things, and the programs reviewed here only represent a cross-section of what's available. As each program differs in scope and function, no Editor's Choice was awarded. After all, there's no point knowing the best book collection software if you collect seashells. Demos of all the software reviewed here can be found on this month's cover CD.

## AudioVideo Keeper

AudioVideo Keeper has an excellent, easy-to-use interface. There are audio and video categories down the left-hand panel, and individual records containing multiple tabs. If you're exceptionally keen, you can add cover images for your collections to the database, but this will considerably expand the database size. Fields can be user defined, but they're also quite detailed. For example, for DVDs you can note screen ratios, audio types and the number of disk sides.



**Contact** RFS Software
**Online** www.strotman.com
**Price** $US10

## El Vaquero Alegre MediaMan 5.1

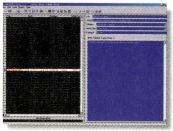
El Vaquero Alegre MediaMan might have a very cool name, but it doesn't have much in the way of features. It's a very basic, DOS-based command line data entry program. Books or music can be catalogued, but options are limited to Book/Music Title and Author/Artist. Entries are dumped to a simple text file. This begs the question, 'Why not just enter them into a text file to begin with?' There are also no functions for editing or correcting your entires — unless you open the files in a text editor.



**Contact** El Vaquero Alegre
**Online** members.nbci.com/C4L38/mediaman.html
**Price** Free

## Latshaw All Media Library 7.1

As the name suggests, All Media Library allows all types of media to be indexed. It's much closer to a fully fledged database than many other applications of its type, allowing for much more complex operations. These include tracking loaned items, viewing individual records and lists of all records, and even setting details for the onscreen display. It's a great program if you have lots to index and want plenty of functions, but it's a bit expensive.



**Contact** Latshaw Software
**Online** www.latshaw.net
**Price** $US99

## Mediathek Millenium Edition

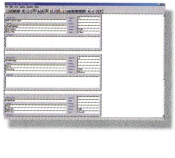
Like some of the other products *APC* examined, Mediathek covers audio and video titles. However, unlike the others, it's free, and has a simple interface and lots of flexibility. It covers just about every form of audio media — unless you have a collection of wax cylinders (but under the circumstances we'll forgive that). The interface isn't very exciting, but it's easy to use. It also gives each media type an individual icon, which is a nice touch.



**Contact** Mediathek
**Online** www.chez.com/sfaucourt/index_us.htm
**Price** Free

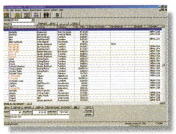
## Retroware Movie Organizer 1.41

When launching a program, there are few things more confusing than being faced with a blank screen, but that's exactly what Movie Organizer presents you with. Once you work out how to enter your movies, things become a lot more simple. It's quite easy to move between views and sort by actors (a great feature). You can even print labels for your tapes, which is good if you copy over old videos and have to keep reusing the original label. Make sure you adjust the default font size — it's tiny.



**Contact** Retroware
**Online** members.aol.com/retroware
**Price** $US12

## TurboSystems Book Librarian



Book Librarian's interface isn't very welcoming for beginners, but it is quite comprehensive. More or less everything can be done with an onscreen button. Adding records is easy, but because the program allows you to enter multiple records, it's also easy to hit the OK button too many times and end up with blank records. Book Librarian also helps you track borrowed items. This is a useful function for portable collections such as books, especially if you tend to swap books with friends and your memory is not too good.

**Contact** TurboSystems
**Online** www.turbosystems.com
**Price** $US32

## TurboSystems Household Register 5.10

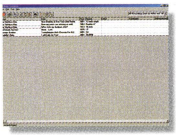


If you're obsessive about keeping track of things, or have a lot of stuff you need to detail for insurance purposes, Household Register could be just what you're looking for. Its broad approach means that just about anything can be indexed, but there isn't as much room for detail as in some programs. You can record item name, owner, location and invoice or pricing details.

This software is very good for tracking home contents for insurance purposes, but you need patience to enter all the details.

**Contact** TurboSystems
**Online** www.turbosystems.com
**Price** $US30

## Ultima Thule Music Database



On first launch, Music Database looks a lot like an empty Microsoft Access database. For a freeware program, it's surprisingly powerful. Recordings can be indexed by year, artist or any other given category. Most of the entry functions are automated, so you don't need to type in 'CD' for each CD. There's no facility for tapes, so if you have a huge collection of cassettes you're out of luck. This program may not be flashy, but it gets the job done.

**Contact** Ultima Thule
**Online** www.ultima-thule.co.uk
**Price** Free

## Video Collection Manager 1.4

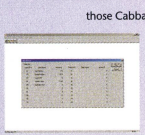


This is a very simple application for indexing and sorting video collections. You can't define categories, but it's very easy to work with the ones provided. Adding entries is a lot easier than in some programs as Video Collection Manager supports the import of plain text files. The search utility is excellent; it allows you to search under multiple criteria. The program also helps you track tapes with blank space on them for future recording.

**Contact** Polyhedra
**Online** www.members.nbci.com/polyhedra/software
**Price** Free

## Sell, sell, SELL !

### Garage Sale '98



Garage Sale '98 is the antidote to all this excess collecting. When it's time to sell off grandad's collection of Victorian etchings or all those Cabbage Patch Kids that have been going mouldy in the shed, you need a utility to track your sales. Garage Sale is good for large families as it allows you to track the sale of items belonging to different family members. It also calculates change.

This is a helpful utility when you want to divest yourself of old collections. Some people will buy anything.

**Contact** Bostrom Design
**Online** www.members.aol.com/bdesign15
**Price** Free

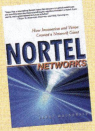
*Read about big corporations, big networks and big problems.*

# Big issues

## Nortel Networks

This book chronicles the development of Nortel Networks, from its inception in 1880 as the manufacturing arm of Bell Telephone of Canada to its position today as a leading supplier and developer of Internet products and infrastructure.

It is the story of a company that has successfully reinvented itself many times and always remained a major player. *Nortel Networks* covers the company's major innovations. These include its first expansion into nontelephone product lines such as fire alarm boxes, sleigh bells and phonographs, and the later manufacture of radios, automatic telephone exchanges and mobile radio communications systems. Nortel's impressive list of products also includes televisions, transistors, integrated circuits, the first digital switches for handling voice and data over the same wire, and fibre optics.




Nortel Networks is a formidable force — and a fierce rival to Cisco and Lucent — but there have been some dark periods in its 100-year history. For example, about 80% of its workforce was retrenched during the Great Depression.

Author Larry MacDonald looks at the people who were instrumental in the transformation of Nortel Networks and focuses on their characters, backgrounds and motives. Occasionally he fails to adequately analyse business strategies. However, a consistent commentary is provided on the financial performance of the company. If you're interested in the development of IT companies, you'll enjoy *Nortel Networks*.

***Cathie Kennedy***

**Author** Larry MacDonald
**Publisher** John Wiley & Sons
**Contact** John Wiley & Sons
**Phone** (02) 9805 1100
**Price** $45
**ISBN** 0471645427
**Rating** ■■■■■■■■■■

## How the Web Was Born: The Story of the World Wide Web

Two scientists from the birthplace of the World Wide Web have stepped forward to reclaim the Web from what they see as the tyranny of big corporations.




Robert Cailliau was part of the original team headed by Tim Berners-Lee at the European Organisation for Nuclear Research (CERN) that developed the framework for the Web in 1990. Along with CERN colleague James Gillies, Cailliau tells the story of the researchers who, since the invention of the telephone, have been working to build the technology behind the Internet.

CERN now promotes itself as the place "where the Web was born", but the peak international research body developed the Web more as a side project than a fully fledged research project.

Despite its successes, the CERN team shifted into the hands of NCSA, Netscape and Microsoft. The Web was then rapidly hijacked by businesses wanting a fast buck and a dazzling stock market debut.

The CERN team descended into frustration and despair as bureaucracy undermined its hopes to use the Web to improve human communication. "The Web wasn't meant to be the passive medium that it has become for most of us," the authors lament. They end their account expressing a desire to see "the Web getting back to its roots".

***Fiona Angus***

**Author** James Gillies and Robert Cailliau
**Publisher** Oxford University Press
**Contact** Oxford University Press
**Phone** (03) 9934 9122
**Price** $32.95
**ISBN** 0192862073
**Rating** ■■■■■■■■■■

## Computers Ltd

Many believe that processor speed, memory size and similar attributes are all that's stopping computers from finding the answers to hard-to-solve problems. This is understandable, as a mere thousandfold increase in speed means a task that previously took a year to complete can be solved within a working day.




However, as author David Harel points out, the difficulty is that some types of problems are inherently not computable. If that's not trouble enough, some problems are computable but intractable. Suppose that an algorithm exists, and the time taken to execute it rises with the size of its input. It may rise so steeply with the size of the input that even for modest inputs, a millionfold increase in speed would still yield an impossibly long runtime. In this context, 'size' might refer to the number of items in a list or the length of an integer.

A similar difficulty arises with memory space. Harel explains that some problems are proven to require at least $2^N$ memory locations for an input of size N. By the time N reaches 270, there wouldn't be enough space in the universe to store all that data "even if each bit were the size of a proton".

This book is intended for a general audience, but it isn't an easy read. However, the effort required to follow the arguments is rewarded by a genuine understanding of the issues. The material is complex and sometimes counter intuitive. The book is expensive for its size and format, so it will be more attractive to libraries than to individuals.

***Stephen Withers***

**Author** David Harel
**Publisher** Oxford University Press
**Contact** Oxford University Press
**Phone** (03) 9934 9123
**Price** $55
**ISBN** 0198505558
**Rating** ■■■■■■■■■■

# PlayStation®2

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# Mix it up

*Try* APC*'s tasty mix of metal and electronica.*

## Superheist

Hailing from Melbourne, Superheist has been on the cutting edge of Australian heavy metal since the release of its first EP three years ago. A number of EPs and singles have followed. The band has five members: Berger (vocals), D W Norton (guitar), Drew (bass), Fetah (keyboards) and Sean (drums).



The first thing you notice about Superheist's latest tracks is the spit and polish that has gone into perfecting their sound. The newest single, 'Crank the System', displays the band's ability to incorporate sinuous grooves and strong vocals into traditional metal — a juxtaposition that works incredibly well.

D W Norton talked to *APC* about composing these tracks. "I'll sit in my bedroom 'til all hours of the night playing my guitar, coming up with new things. If I like something, I'll record it on anything I can get my hands on, cassette, handycam, voicemail, anything. From there I'll usually finish the song and take it to rehearsal and run over it with the other guys."

Superheist is no stranger to live performance, and their talent has allowed them to tour with such bands as Sepultura, Grinspoon, Shihad and 28 Days. As for the band's title, Norton explained, "I liked the name Heist, and our singer, Berger, liked the name Super, so it pretty much worked out from there. At the time, we were pretty anti-record industry, and we were keen to rip off, hence the name Superheist, or big rip-off."

Superheist support MP3 as a promotional tool for getting their music out to new audiences. The band is currently working on a new album with Australian independent label Shagpile. As for their immediate plans, Norton explained, "We plan on touring our little arses off. The new single 'Bullet' is out in March and the album is out in April, so we'll be pretty busy for the next few months."

**Track** Crank the System
**Online** www.superheist.com

### Superheist video

This month, *APC* brings you the music video for Superheist's featured track 'Crank the System'. It features the band banging around inside a metal cage, with some equally rowdy fan action going on outside. Good stuff!





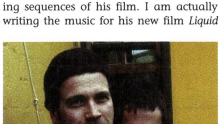


## Sinister Sam

Sinister Sam is composed of brothers Anders and Matthew Neilsen, both born in the small town of Braidwood in NSW's Southern Highlands. Named after a character in the children's program *Sesame Street*, the duo first began creating electronic music three years ago.

"Sinister Sam is the meanest, nastiest cowboy this side of anywhere. Of course, we find out that the only reason he is so pissed off is that he thinks somebody has stolen his crayons. Friends of ours with small children know of his 'bad ass' reputation," Anders explained.

Their featured track this month is also the title song for *Computer Boy*, a humorous take on *The Matrix* filmed in some of the same locations (search www.ifilm.com for more details). "I met Abe Forthyth (*Computer Boy*'s director) through a mutual friend. He heard the song and thought it would work well for the opening and closing sequences of his film. I am actually writing the music for his new film *Liquid*



*Blue*, which I think will be ready sometime in the next two months," Anders said.

When it comes to composing their tunes, Anders tends to pick a sample or groove and then plays around with various sounds until he finds something he likes, slowly adding more layers to the track. The task of editing and polishing falls to Matt. "If it wasn't for him, I'd still be working on 'New Moon' as we speak, and it would be over nine hours long. Matt's the editing man," Anders explained.

Anders is also currently creating tracks under the name The Fearless Leaders, which is a "more hip-hop, funk-type thing which we want to work as a live act". Keep your eyes peeled for upcoming Sinister Sam tracks.

***Daniel Gardiner***

**Track** New Moon
**Online** sinistersam99@hotmail.com

# Blinded by science?

*Unsure how you feel about cloning? Want to know more about cancer or conservation? Perhaps your kids want to explore physics or astronomy. Get up to speed on all sorts of science and technology issues with these Web sites.*

## ABC Science Online

This portal for the ABC's science sites looks like it is aimed at children, and much of it is pitched at an appropriate level for them, but there is also a lot of information to spark the interest of adults. There are FAQs, mailing lists, an events diary, science news, details of ABC radio and TV science programs, and a search facility for the portal. You'll also find personalities like Dr Karl, features on the environment, space and health, and when we looked, a highlight article on artificial limbs.



Online www.abc.net.au/science
Rating

*Megan Smith*

## BBC Online: Science

This UK site has science-related news and information from BBC radio and TV programs. You can download past radio and TV items, post or answer scientific questions on the message board, and search the whole BBC network of sites, from gardening to sport. You can also search its science-related sections specifically, and if you do, you'll find such gems as Douglas Adams's views on the Internet, and the Walking with Dinosaurs site. A well-presented site with a little bit of everything.




Online www.bbc.co.uk/science
Rating

*Megan Smith*

## CSIRO

With its very own domain, the Web site for Australia's peak independent scientific research body is perhaps the most comprehensive and significant contribution any Australian organisation has made to the World Wide Web. The site provides access to a wealth of in-depth research in a variety of fields. Updates on the latest research projects are available, including the Linux-based Caduceus supercomputer. This is the front line of science, and the site has a no-frills approach to presenting serious research.

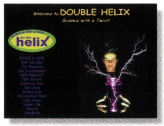



Online www.csiro.au
Rating

*Fiona Angus*

## The Double Helix Science Club

Does your child prefer star gazing and watching native wildlife to anything Sony can come up with? If so, introduce them to Double Helix, a club dedicated to fostering the spirit of scientific inquiry in primary school students. The club is run by the CSIRO. The Web site features articles on everything from the mysteries of the Antarctic to virtual reality. Updates on club workshops are available, and members can join conservation initiatives across Australia. However, your child will require tenacity to navigate the poorly laid out site.




Online www.csiro.au/helix
Rating

*Fiona Angus*

## The Exploratorium

If you want to see what happens when art and science meet, then step through the online gateway to the The Exploratorium, located in San Francisco's Palace of Fine Arts. Once there, you can view the extensive archive of Webcasts on virtually any scientific topic you can think of and sample some of the 500 or so interactive exhibits on display in the museum.



*AM Lightening* (pictured), a plasma sculpture by artist Bill Parker, is just one example of the mystifyingly beautiful creations you can expect to see at this site.

Online www.exploratorium.edu
Rating

*Vanessa Fazzino*

## ExploreScience

Aimed at teachers and students, this interactive site provides a hands-on educational approach to science. However, most people outside the education system will also find ExploreScience interesting. The site is part of the ExploreLearning network which is expanding to provide multimedia learning experiences in a wide range of subjects. A range of experiments and games are provided to demonstrate the principles of science in new and interesting ways. Take a look and you'll see that scientific concepts don't have to be dull and boring.




Online www.explorescience.com
Rating

*Gail Lipscombe*

## New Scientist

The companion Web site to the *New Scientist* weekly magazine, www.newscientist.com is a great read for those with a keen interest in science. The site provides some of the print magazine's main features and articles, and it has a news section with the latest snippets from around the world. There are forums to participate in, as well as detailed features that don't make it into the print magazine.




The Web is overflowing with science magazine companion sites, but www.newscientist.com has a lot more content than others — and it's free.

**Online** www.newscientist.com
**Rating** ▮▮▮▮▮▮▮▮▯▯

*Darren Ellis*

## PhysLINK

This fascinating site carries a broad range of science topics and links. The layout is clear and appealing, and the content varies from serious and scholarly to wacky and wonderful. Detailed essays by notable scientists are available (for example, there's an essay on whether the universe shows evidence of having been designed), along with links to sites offering new theories on longstanding scientific problems. You can also ask experts questions about physics, and there are forums and information pages intended for graduate students in science.




**Online** www.physlink.com
**Rating** ▮▮▮▮▮▮▮▮▯▯

*Suzanne Fraser*

## Popular Science

Ever wondered why the palms of your hands don't tan? Or why breath mints make your mouth feel cool? If you have, take a look at the 'Ask PopSci' link on the popsci.com Web site.



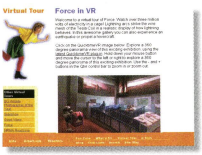

The print magazine *Popular Science* is in its 129th year of publication. Its Web presence has only been going a fraction of that time, but its output is just as solid. You will find this a refreshing and informative site which provides excellent material for dinner party conversation.

**Online** www.popularscience.com
**Rating** ▮▮▮▮▮▮▮▮▯▯

*Francesco Lopez*

## Questacon

Questacon — the National Science and Technology Centre in Canberra — is a flurry of activity. The centre fosters hands-on science at its finest and most fun, and Questacon's online bungalow is an excellent extension of this. It is a colourful and lively site; one with much to keep young and enquiring minds occupied. QuickTime VR and Flash have been used so that visitors can take part in online exhibitions, puzzles, adventures, and the odd virtual tour.




A text-only site is coming soon.

**Online** www.questacon.edu.au
**Rating** ▮▮▮▮▮▮▮▮▯▯

*March Stepnik*

## ScienceDaily

ScienceDaily describes itself as an online magazine and Web portal devoted to science, technology and medicine. However, only the part about it being a portal is true. ScienceDaily is not a magazine or news site per se. Rather, its articles are selected from news releases submitted to it by universities and other research organisations. It claims these are from around the world, but they are mainly from the US. There is a strong emphasis on health and medicine, but you will also learn about the latest research in other scientific fields including astronomy, geology and meteorology.




**Online** www.sciencedaily.com
**Rating** ▮▮▮▮▮▮▮▮▯▯

*Francesco Lopez*

## Sciseek

Sciseek is a great site for top breaking science news. There are 14 categories to choose from to narrow your information searches to a specific branch of science. You'll find every possible calculator and converter here and an online shop with science-based products for all ages that range from the serious to the quirky. You can also chat to other enthusiasts about all things scientific on the site's message boards. An odd inclusion is a page on locating missing and sexually exploited children.




**Online** www.sciseek.com
**Rating** ▮▮▮▮▮▮▮▮▯▯

*Gail Lipscombe*

# Telstra: making the future easier

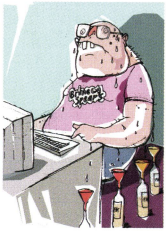
*Telstra has announced an extensive reshaping of its R&D division for the first time in nearly 80 years. Its New Wave labs will bring together a bunch of innovative young boffins, so you can expect to see plenty of new developments from the communications giant. Chip Chat speculates on what you're likely to be buying in the next couple of years.*

## Chocolate telephone



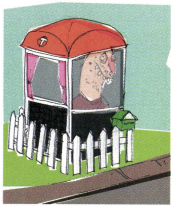
Every day, simple phone lines carry thousands of bits of data — most of it porn. All that porn is bound to work up a person's appetite, so why not remedy the sugar deficit with tempting and nutritious chocolate telephones?

## Geek fat



Telstra realises that energy is a big business and that oil reserves are running low. However, this shortage could soon be eased by the geek community, where a hefty gut is a badge of honour. The geek fat initiative allows bulkier geeks to work off their cable modem bills by sweating into specially prepared buckets. From there it's just a short trip to the petrol pump, where a new fuel mix, LARD, will join LRP, premium unleaded and diesel.

## Tel-strata



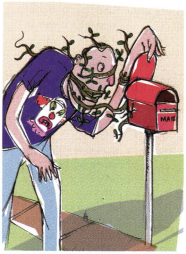
Phone booths are already a lucrative source of revenue, but they're set to become even more profitable when Telstra starts leasing them out to university students as part of its 'commitment to higher education'. Just think of it: 'Open air, single bedroom with panoramic view. Suit exhibitionist with no sense of smell. Some public access. $400 a week.'

## Telstra fried magpie



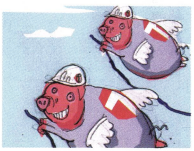
Look at any phone cable strung above the street and you'll more than likely see a resting magpie. That image will soon become a thing of the past with plans to run random electric charges down phone lines, roasting the birds street by street. They can then be collected, breaded, and sold in a tasty bun. Who says big business isn't interested in recycling?

## The missing bits from *The Plant*



Under a licensing deal with Stephen King, Telstra bills will carry the already published chapters of his aborted e-novel *The Plant*. Customers who spend over $400 a month will receive the unpublished chapters. This should bring in lots of business from overseas readers as well. Similar negotiations will begin with Jackie Collins and J K Rowling soon.

## Cheap ADSL connections Australia wide



Yeah, right. There are still some things that Telstra just isn't willing to even consider.

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